DOCUMENT RESUME

ED 167 114 IR 006 854

AUTHOR Maser, Arthur L.; And Others
TITLE Highline Public Schools Computer-Assisted Instruction Project: A Program to Meet Disadvantaged Students' Individual Needs for Basic Skill Development: Final Report.
INSTITUTION Highline Public Schools, Seattle, Wash.
PUB DATE 30 Jun 77
NOTE 114p.; Parts marginally legible due to print quality

EDRS PRICE MF-$0.83 HC-$6.01 Plus Postage.
DESCRIPTORS Arithmetic; *Basic Skills; *Computer Assisted Instruction; *Economically Disadvantaged; Educational Alternatives; *Educationally Disadvantaged; Language Skills; Parent Attitudes; *Program Effectiveness; Reading Skills; Secondary Education; Skill Development; Student Attitudes; Teacher Attitudes

ABSTRACT

This description of a computer-assisted instruction project, which provides an alternative approach to individual instruction in basic skills for economically and educationally disadvantaged students at the secondary level, includes the results of evaluations conducted at the end of each of three school years. Instruction in priority areas--arithmetic, language arts, and reading--was administered to students severely deficient in one or more skill areas in a different manner within each school. Management and student outcome objectives were evaluated by written documentation and data on student pre- and posttests. Data indicate that student use was excellent during the 1974-1975 school year, outcome objectives were met, and response by students, parents, and faculty was generally positive. Management and student outcome objectives in the second year of implementation met or exceeded expectations, student and teacher involvement increased remarkably, and student, parent, and faculty attitudes were especially positive. Objective data for the third year of operation produced the most outstanding results, indicating that the program was highly successful and that computer-assisted instruction is a viable method of building basic skills with eligible students. (CWM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED167114

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

FINAL REPORT

HIGHLINE PUBLIC SCHOOLS

COMPUTER-ASSISTED INSTRUCTION PROJECT

A Program to Meet Disadvantaged Students'
Individual Needs
for
Basic Skill Development

June 30, 1977

BEST COPY AVAILABLE

BOARD OF DIRECTORS

James W. Rice, President
Owen Torseth, Vice President
Iris L. Knapp
Glen M. Rose
Ray Walberg

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Arthur Maser

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

Dr. Robert D. Sealey, Superintendent
Dr. Gene Craig, Assistant Superintendent for Instruction

Report prepared by:

Dr. Arthur L. Maser, Director
Educational Research & Evaluation

Vern Johnson
Evaluation Assistant

Jay Davis
CAI Project Manager

IR006854

TABLE OF CONTENTS

List of Tables ii
Overview iv
Introduction 1
Highline's Computer Assisted Instruction System 5
CAI Areas of Instruction 9
Student Use of CAI Terminals 11
Goals and Objectives 16
Management Objectives 16
Student Outcome Objectives 16
CAI Evaluation 1974-1975, Overview 19
Evaluation of the Objectives 20
Management Objectives 20
Student Outcome Objectives 25
Conclusion 29
School Year 1975-1976 40
Evaluation of Management Objectives 40
Evaluation of Student Outcome Objectives . . 44
Summary 56
School Year 1976-1977 57
Evaluation of Management Objectives 57
Evaluation of Student Outcome Objectives . . 66
Summary 72
Review 73
Appendices 81

List of Tables

Table 1. Student Use in the Computer Assisted Instructional Program: Final Report; 1975-1976 14

Table 2. Student Use in the Computer Assisted Instruction Program: Final Report; 1976-1977 15

Table 3. Mean Grade Equivalent Score Gains, Pre-Posttest on the CTBS; Arithmetic . . . 25

Table 4. Mean Grade Equivalent Score Gains, Pre-Posttest on the CTBS; Language Mechanics 26

Table 5. Mean Grade Equivalent Score Gains, Pre-Posttest on the CTBS; Reading 26

Table 6. CAI Program Evaluation Survey, Faculty 30

Table 7. CAI Program Evaluation Survey, Parents 34

Table 8. CAI Program Evaluation Survey, Students 36

Table 9. Summary: CAI Use and Response to Attitude Survey 38

Table 10. Mean Grade Equivalent Score Gains, Pre-Posttest on the SAT: Arithmetic . . . 45

Table 11. Mean Grade Equivalent Score Gains, Pre-Posttest on the SAT: Language 46

Table 12. Mean Grade Equivalent Score Gains, Pre-Posttest on the SAT: Reading 47

Table 13. CAI Student Growth on CCC Authors' Procedures 48

Table 14. Program Evaluation Survey, CAI, Faculty 53

Table 15. Program Evaluation Survey, CAI, Parents 54

Table 16. Program Evaluation Survey, CAI, Students. 55

Table 17. Mean Grade Equivalent Score Gains; Pre-Posttest on the SAT: Arithmetic . . . 67

Table 18. Mean Gains as Determined by Procedures for Measuring Student Achievement Developed by CCC 68

List of Tables, Continued

Table 19. Mean Grade Equivalent Score Gains Pre-Posttest on the SAT: Reading 69

Table 20. CAI Student Growth as Measured by the Curricular Materials: H-P and CCC 70

Table 21. Mean Grade Equivalent Score Gains, Pre-Posttest: Arithmetic 74

Table 22. Mean Grade Equivalent Score Gains, Pre-Posttest: Language Arts 75

Table 23. Mean Grade Equivalent Score Gains, Pre-Posttest: Reading 75

Table 24. Program Evaluation Survey - CAI, Faculty 77

Table 25. Program Evaluation Survey - CAI, Parents 78

Table 26. Program Evaluation Survey - CAI, Students 79

Figures

Fig. 1 Network 1974-1975 . . . 6

Fig. 2 Network 1975-1976 . . . 7

Fig. 3 Network 1976-1977 . . . 8

OVERVIEW

In the Spring of 1974, the Highline District applied for and received a special incentive (Title I, Part B) grant award to plan, develop and operate a Computer-Assisted Instruction project to supplement the regular Title I, Part A program. The cost of computer hardware was beyond the scope of the district's Title I, Part A funding and the special incentive grant award made it possible to acquire a central computer unit and 32 terminal ports on a lease-purchase agreement.

The cost of operating the project during the 1974-1975 school year was just under $117,000, with $20,000 of this amount coming from the district's Part A allocation. An evaluation by Seattle Pacific College showed student achievement gains in the basic skills of mathematics, reading and language arts of 1.22 to 1.45 months for each month in the Computer-Assisted Instruction (CAI) project. Attitude surveys revealed that students and parents and teachers had positive feelings about CAI.

Leasing arrangements for the computer and terminals provided for operation of the project at optimum capacity at a total operating cost of $99,050 during the 1975-1976 school year. The Parent Advisory Committee and Title I faculties, at their April, 1975, meetings, reassessed the educational value of the CAI project and recommended that it be continued. This commitment of support included shifting $43,750 from the regular Title I, Part A program exclusively to the CAI budget. A grant was awarded by the Division of Special Programs and Services in August, 1975, to continue the project for a second year.

An unprecedented third year special incentive grant was awarded for the 1976-1977 school year for the purposes of continuing the CAI project and disseminating information about it throughout the

State of Washington. The Title I Parent Advisory Council, Title I principals and Title I faculties, at their April, 1976, meetings, voted to increase the Title I, Part A commitment to $53,045. Along with the special incentive grant this provided a budget of $118,655 for the past year. The increase in the budget was due to three major factors: (A) increase in personnel cost due to salary increases, (B) increased cost in telecommunications (two more ports were placed at remote sites), and (C) an additional expansion in the dissemination of information throughout the State of Washington.

INTRODUCTION

The major emphasis of the Computer-Assisted Instruction project in Highline is to provide an alternate approach to individual instruction for economically and educationally disadvantaged students. The project serves students from ESEA Title I designated schools in the District.

For the past three decades educators have attempted to provide individual student instruction by reduction of class sizes so that the teacher could work more closely on a one-to-one relationship with students. However, even with the general reduction in class size and grouping within classrooms of students of various ability levels, individualized instruction has still remained a theoretical goal rather than an accomplished objective. The major difficulty has been and still remains that of providing a tutorial system for educationally deficient students.

Since about 1967 the acceptance and use of computer assisted instruction has increased to the point that there are now thousands of terminals and learning centers across the nation. They may be found in universities as well as in first grade classrooms. The systems range from one or two terminals in smaller installations to over one thousand terminals in Texas classrooms.

Computer assisted instruction has provided for individualizing instruction, particularly in those instructional areas where tutorial instruction is most efficient. It provides a personalized program of instruction given at the student's level of achievement. The greatest successes in CAI are in the basic skills: reading, math, and language arts.

In almost every case where CAI is used with a significant number of hours per pupil, remarkable growth has been reported as measured by normative based achievement tests. Typical findings in large cities where the average growth for reading for learning disadvantaged children has been four months growth per year, have shown 9.8 months or better for children on CAI. No other methods have shown such consistent and highly significant statistical growth over the years. These findings have been reported in Newark, New Jersey; Montgomery County, Maryland; Akron, Ohio; Los Angeles County, California; and Chicago, Illinois.

Another result, derived from observations of children in the lower quartiles of achievement, is that they have been making greater gains than children in the upper range of achievement. This is contrary to our previous experiences in growth patterns where children's achievement generally creates an ever widening spread in test scores and "the rich get richer and the poor get poorer." This unexpected trend may be due in part to the fact that there is a greater deficit in achievement for lower achieving children and that there is more room for growth. However, the gains made by children in other quartiles are also substantial and are not to be overlooked. These gains are largely the result of intensive drill and practice in the basic skills where the child interacts with a computer terminal in scheduled sessions of ten to twenty minutes a day. The computer is very adept for this application.

CAI programs are designed to immediately assign the student to subject matter areas or levels where he experiences a particular level of success and move him forward as rapidly as he demonstrates mastery over the subject matter. CAI programs as an alternative for individual instruction have some additional unique characteristics. These programs give instant feedback to the child's responses and he is usually allowed to correct errors. In some

programs there is a tutorial phase which shows the child why his answer is wrong. The net result of this aspect of the program is very high motivation and growth for pupils. In addition, children who have learning deficits typically have poor tolerance to delayed gratification. That is, these children usually see minimal relationship between actions today and success or failure as represented by marks on a report card. The computer terminal, with its one or two seconds response time, graphically provides the pupil immediate feedback to his input. The student knows he is in control and can readily see the cause and effect relationship in his answers. There is also good evidence that the immediate response of the computer terminal provides effective reinforcement to learning activities. As CAI effectively brings up the achievement level of lower quartile pupils especially there is a reduction in the frustration level and the pupils' self-confidence improves. In general, the emotional climate of the institution is improved.

Computer assisted instruction has also shown convincing evidence that it is an effective medium for developing an improved self-concept, particularly as that self-concept is related to locus of control. Locus of control may be internal or external. J. B. Rotter (1966) said, "When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual, we have labeled this a belief in <u>external</u> control. If the person perceives that the event is contingent on his own relatively permanent characteristics, we term this a belief in <u>internal</u> control."

Vasquez (1974) reported that the understanding of cause-effect relationships is essential to internal attribution of success or

failure on the part of the child. This understanding has not been developed adequately in the mind of the external individual because of negative social experiences within the family, within a poverty-level existence, possibly even within a culturally biased classroom. Speculation as to why computer assisted instruction gives evidence of increased internality has included the following points:

(1) Immediate feedback.
(2) Lack of external variables to which a student might attribute his success or failure.
(3) The very specific directions that the computer gives the learner, and the computer's low tolerance for deviation from the directions.
(4) The one-to-one relationship between the learner and the terminal.
(5) The programmed success that the pupil experiences on most CAI courseware.

The above are, more specifically stated, the same factors that also appear to account for the success of Computer Assisted Instruction as a satisfactory mode of instruction in basic skills areas for educationally disadvantaged students.

The reported evidence of success of CAI programs nationally, and the evaluation of Highline's program (1974-1977) demonstrate the value of CAI in supporting the two most frequently stated goals of ESEA, Title I programs. These are: providing special programs for educationally and socially disadvantaged pupils for the purposes of (a) improving their educational skills, and (b) improving their motivation toward learning through an enhanced concept-of-self.

HIGHLINE'S COMPUTER ASSISTED INSTRUCTION SYSTEM

The basic hardware for Highline's CAI system is a Hewlett-Packard 2000F Mini-Computer System. This system operates on a time-sharing basis and consists of several components.

Time Sharing Components

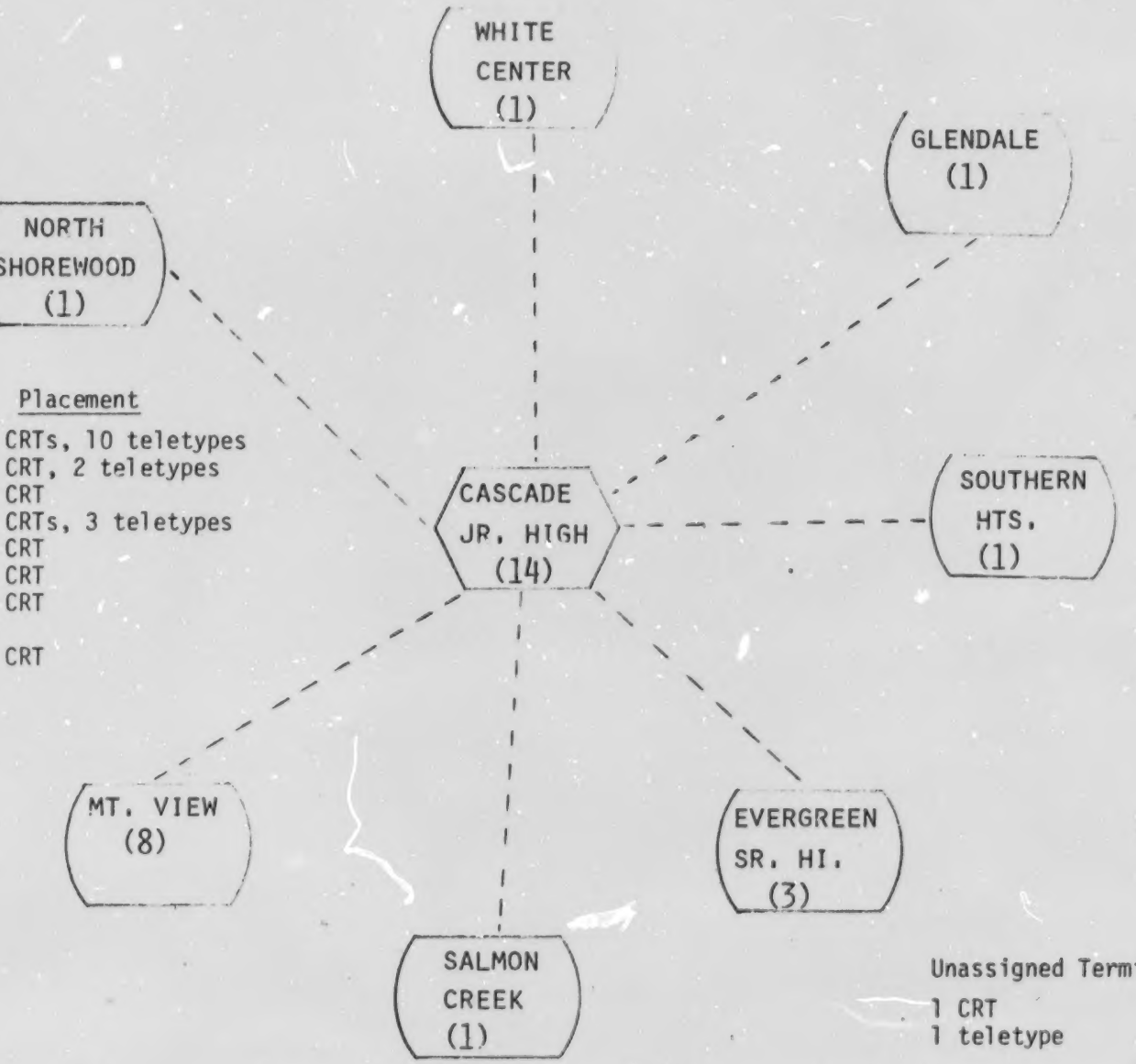
- 1 Mini-Computer system processor with 32K core memory
- 1 Mini-Computer communications processor with 8K core memory
- 1 Hardware multiplexer
- 1 23.5 Megabyte disc file
- 1 9-Channel magnetic tape unit
- 1 High-speed phototape reader
- 1 Systems console
- 32 Terminals and related telephone communications equipment

These devices (22 CRTs, 8 teletypes, and 2 DecWriter IIs) are used by students at the computer site (Cascade Junior High) or at remote locations to communicate with the programs stored on the computer. The schematic descriptions on the following pages reflect the location of the system components during the three years of operation.

The allocation of terminals from year to year to the schools participating in the CAI project was made on the basis of the number of students in each building's Title I population and the school's degree of interest in the project. One of the "floating" terminals, a DecWriter II, is presently installed in the Research and Evaluation office, where it is used to generate regular reports on students' progress.

Fig. 1

1974-1975



TERMINALS

School	Placement
Cascade (14)	= 4 CRTs, 10 teletypes
Evergreen (3)	= 1 CRT, 2 teletypes
Glendale (1)	= 1 CRT
Mount View (8)	= 5 CRTs, 3 teletypes
North Shorewood (1)	= 1 CRT
Salmon Creek (1)	= 1 CRT
Southern Heights (1)	= 1 CRT
White Center Heights (1)	= 1 CRT

Unassigned Terminals (2)

1 CRT
1 teletype

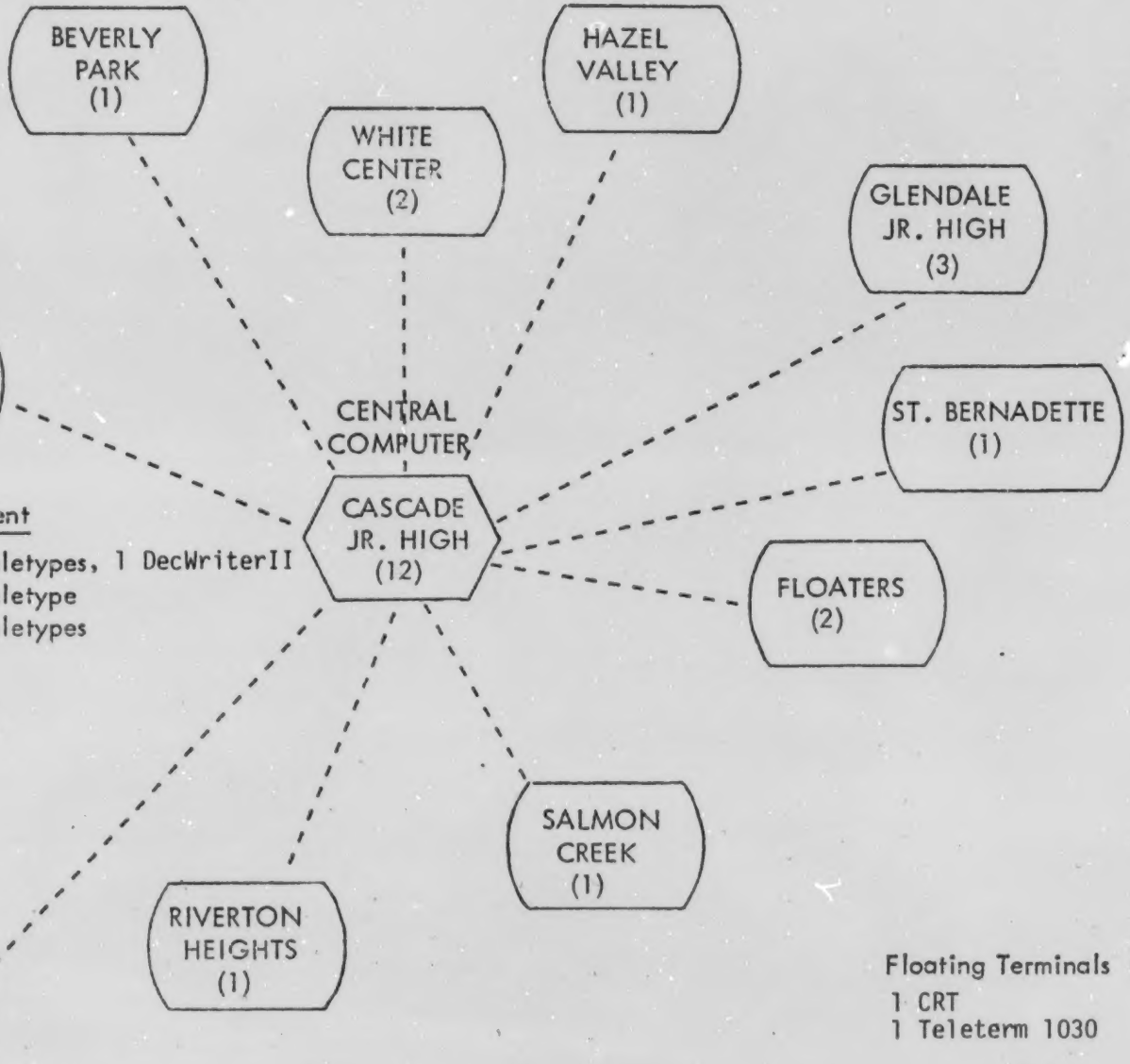
1.3

14

Fig. 2

1975-1976

------ = Telephone Lines

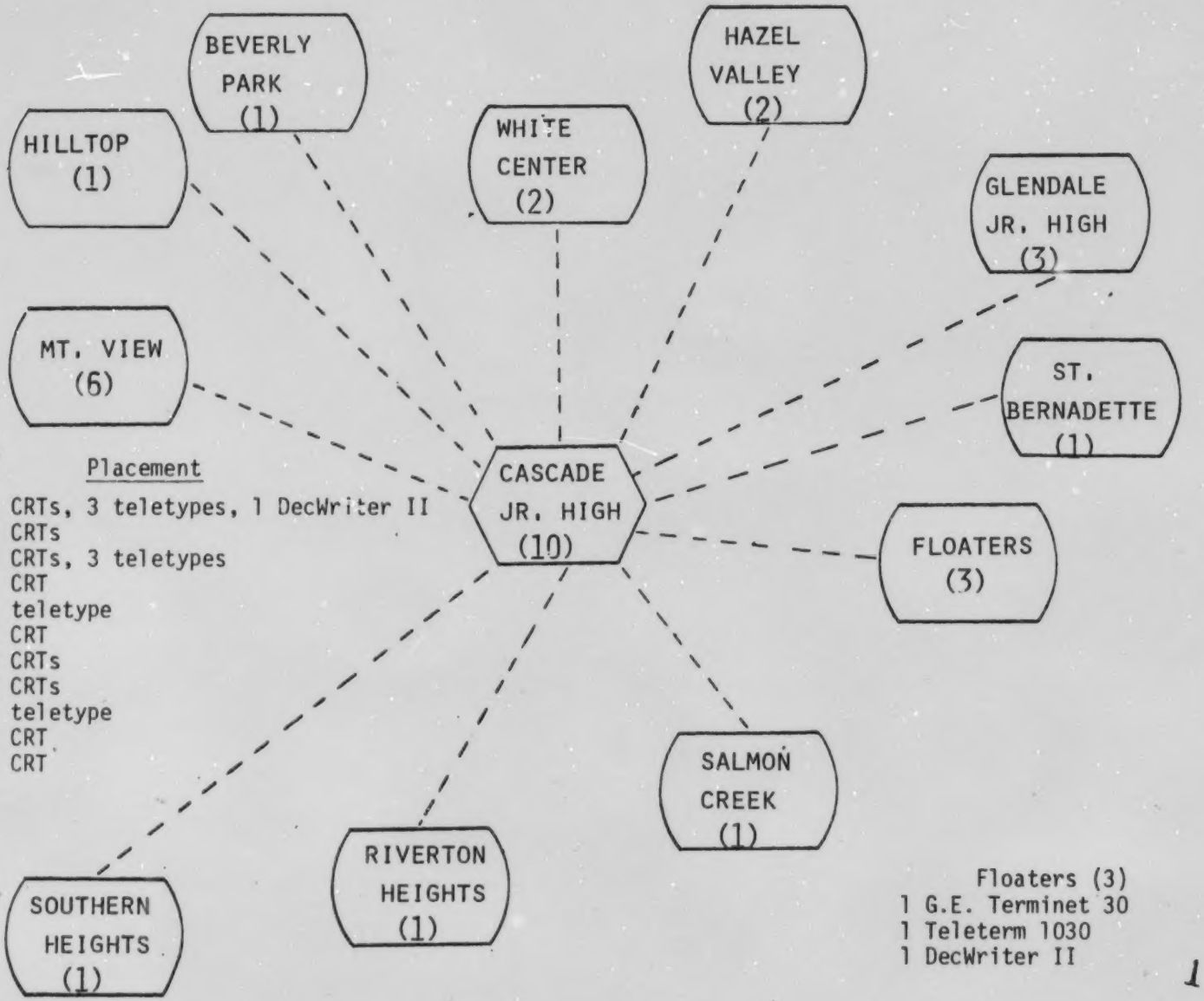


TERMINALS

School	Placement
Cascade (12)	= 8 CRTs, 3 teletypes, 1 DecWriterII
Glendale (3)	= 2 CRTs, 1 teletype
Mount View (7)	= 3 CRTs, 4 teletypes
Beverly Park (1)	= 1 CRT
Salmon Creek (1)	= 1 CRT
Hazel Valley (1)	= 1 CRT
White Center Hts. (2)	= 2 CRTs
Riverton Heights (1)	= 1 CRT
Boulevard Park (1)	= 1 CRT
St. Bernadette (1)	= 1 CRT

Floating Terminals (2)
1 CRT
1 Teleterm 1030

Fig. 3



TERMINALS

School	Placement
Cascade (10)	= 8 CRTs, 3 teletypes, 1 DecWriter II
Glendale (3)	= 3 CRTs
Mount View (6)	= 3 CRTs, 3 teletypes
Hilltop (1)	= 1 CRT
Beverly Park (1)	= 1 teletype
Salmon Creek (1)	= 1 CRT
Hazel Valley (2)	= 2 CRTs
White Center Hts. (2)	= 2 CRTs
Riverton Hts.(1)	= 1 teletype
Southern Hts.(1)	= 1 CRT
St. Bernadette (1)	= 1 CRT

Floaters (3)
1 G.E. Terminet 30
1 Teleterm 1030
1 DecWriter II

CAI AREAS OF INSTRUCTION

The priority areas of instruction provided for by Highline's CAI system are:

1. Arithmetic, Computation and Applications;
2. Language Arts, Mechanics and Spelling; and,
3. Reading, Vocabulary and Comprehension.

The computer instruction programs (software) used in the Highline project were produced by and are leased from the Computer Curriculum Corporation of Palo Alto, California, for Language Arts and Reading. The area of Mathematics uses a curriculum package produced by Hewlett-Packard.

Arithmetic. The Hewlett-Packard system mathematics curriculum package has 24 concept blocks for each grade, one through six. Each block has a pretest, five main lessons, and post-test. The package starts each student at a level that will challenge him and then the system automatically generates problems of the appropriate difficulty level based on the student's performance on the pretest and each successive lesson.

Language Arts. This program is designed to help remedial and average students master common problems of standard English usage and stresses usage rather than grammar. Students learn by example rather than by memorizing rules and terms. Eight major areas of common usage problems are covered by this program that function effectively with most language arts textbooks.

Principal Parts of Verbs	Contractions, Possessives, and Negatives
Verb Usage	
Subject-Verb Agreement	Modifiers
Pronoun Usage	Sentence Structure
	Mechanics

These materials are divided according to Topics and Strands. There are twenty Topics for each grade that may be selected by the teacher allowing for individualized instruction for each student. The Strands follow the major groups of usage problem areas and are arranged in difficulty from grade level 3.0 to 6.9. A computer record of each student's progress in the Strands is maintained to (1) provide a permanent record of the student's learning, and (2) to determine the next level of material to be covered by the student.

Reading. The reading program also has two parts, Basic Sentences and Strands. The Basic Sentences program begins at grade level 2.5 and ends at grade level 3.5. The items are short and easy and represent the simplest type of practice problem that can be presented in a CAI system.

The Strands extend from grade level 3.5 through grade level 6.9. A Strand is a sequence of related items. There are five Strands in the program as noted below. When working in this program, the student receives items from each Strand during every session. The program also permits the student to move at his own pace. The five Strands are:

Strand A	Word attack - analyzing words as units
Strand B	Vocabulary - building a reading vocabulary
Strand C	Literal Comprehension - understanding the literal meaning of sentences and short paragraphs
Strand D	Interpretive Comprehension - reading sentences for interpretation
Strand E	Work-Study Skills - learning to use resources effectively

STUDENT USE OF CAI TERMINALS

Students who use the CAI facilities have been selected according to their performance on normative based achievement tests administered in their regular school classes, and teacher evaluations of their progress. The selection process is to identify those students who have severe deficits in one or more of the three basic skills areas.

Each Title I school uses computer assisted instruction in a somewhat different manner. Their approach to the integration of CAI is determined by the unique characteristics of the school. For example, Mount View Elementary School uses a non-graded system with team teaching. Students are placed in a special reading program and are scheduled to the CAI room as part of their program. This room has the services of a teacher's aide who assists the students with the use of the terminals, the lessons, and regulates the CAI schedules. This program also uses the language arts and mathematics packages. At Cascade and Glendale Junior High Schools students in selected basic skills classes are scheduled to the CAI room for remedial sessions. At Cascade Junior High School the CAI project manager is in charge and directs the students' activities, while at Glendale Junior High School the students' efforts are directed by a teacher's aide.

In the other Title I schools, the students are placed with a basic skills specialist who uses a computer terminal in a Title I designated resources area. Students are scheduled from their regular classroom for this additional help in basic skills.

Typical scheduling of students for computer assisted instruction is four 10-minute sessions per week. However, many students ask for and receive additional time at the terminal. In some cases

students arrive early in the morning or spend part of their lunch period or even stay after school to gain additional time at the terminals. This again reinforces the observation that the motivation level is particularly high among those students who are involved in computer assisted instruction.

Table 1 lists the percent use of the CAI terminals in the participating ESEA Title I schools for the first and second semesters of the 1975-1976 school year. The use of terminals was low for most schools in September because of the need to first identify students to be involved in CAI and the time required for indoctrination (both students and teachers). However, the use of the CAI facilities increased and was maintained at an acceptable level throughout the entire year.

Some bits of information about the 1975-1976 CAI program follow:

Number of Lessons Completed

14,797 lessons in Language Arts
30,579 lessons in Mathematics
30,579 lessons in Reading

This makes a total of about 75,721 student lessons done this year.

Table 2 shows the monthly usage of the CAI terminals in the participating ESEA Title I schools for the first and second semesters of the 1976-1977 school year. In order to reflect more on the student usage a change in reporting was made from percent usage (1975-1976) to lessons per day per terminal (LDT) for the 1976-1977 school year. It was determined that in a 5-1/2 hour elementary school day and a 5 hour secondary school day (including movement time, recesses, and lunch breaks) that in the elementary schools 23 lessons per day per terminal should be offered. At the secondary level 20 lessons per day per terminal should be given. Assuming an 80% usage level as being acceptable, the minimum level of usage was set at 18 LDT at the elementary level

and 16 LDT at the secondary level. Additionally, a change was made in reporting total student enrollment to student enrollment per terminal (ET). Using the same criterion stated previously, enrollment minimums were set at 23 students/terminal at the elementary and 20 students/terminal at the secondary level.

Again as in past years the usage was low in most schools during September because of the need to identify eligible students, but by November the usage was acceptable and remained as such throughout the year.

During the past year the CAI program has provided:

Number of Lessons Completed
5,288 lessons in Language Arts
34,477 lessons in Mathematics
35,595 lessons in Reading
383 lessons in Spelling

This makes a total of 75,743 student lessons given this year. This year the student day had been decreased to 5 periods, when equating the usage during the 1976-1977 school year (75,743 lessons) to the student lessons given in 1975-1976 (75,721) we note an increase of 20% in the number of lessons provided.

In addition, due to parent and teacher request, a program in spelling drill and practice was developed and piloted in two schools (note: 383 student lessons). In the future this courseware will be further refined and provided as an addition to the reading, mathematics and language arts presently offered.

Table 1

STUDENT USE IN THE COMPUTER ASSISTED INSTRUCTION PROGRAM:

FINAL REPORT; 1975-1976

SCHOOL	September			October			November			December			January*		
	%	N	E	%	N	E	%	N	E	%	N	E	%	N	E
Cascade Jr. Hi.	51.8	280	360	76.0	275	368	79.6	270	373	83.6	275	378	80.8	306	401
Glendale Jr. Hi.	26.5	69	75	65.4	74	75	94.1	84	98	105.1	79	98	96.2	93	109
Beverly Park	88.8	29	29	92.6	29	29	148.9	29	29	143.3	30	30	146.4	30	30
Boulevard Park	0.0	23	23	83.0	23	23	85.8	23	23	87.1	23	23	62.1	24	24
Hazel Valley	0.0	34	34	56.6	34	34	110.0	35	35	119.5	35	35	106.6	35	37
Mount View	44.2	160	168	62.3	124	154	135.5	128	170	94.2	125	176	87.1	124	179
Riverton Hts.	50.7	24	34	77.1	23	38	87.8	24	40	84.3	21	41	97.1	23	45
Salmon Creek	40.4	18	18	72.3	24	24	108.2	25	25	112.5	25	25	103.8	25	25
St. Bernadette	108.2	36	49	113.0	36	51	119.4	36	51	110.4	41	55	120.8	41	54
White Center	73.0	54	63	99.2	54	63	114.8	54	63	115.0	54	63	124.0	54	63
Total	49.2	727	853	71.4	696	857	98.9	708	907	95.5	708	924	91.4	755	967

SCHOOL	February			March			April			May			SUMMARY/YEAR: Lessons			
	%	N	E	%	N	E	%	N	E	%	N	E	Lang	Math	Read	Total
Cascade Jr. Hi.	77.8	371	462	87.3	376	526	84.0	377	560	79.2	367	559	4991	15277	6491	26759
Glendale Jr. Hi.	80.5	92	108	79.8	95	110	82.0	102	125	72.7	102	127	446	4907	1498	6851
Beverly Park	141.2	32	32	156.4	32	32	158.9	32	32	162.9	32	32	854	--	3464	4318
Boulevard Park	60.1	19	19	73.2	26	26	94.8	26	26	77.0	26	26	1650	--	385	2035
Hazel Valley	116.4	37	44	110.5	38	47	99.0	39	48	93.3	39	48	--	815	1906	2721
Mount View	92.2	127	183	88.8	122	179	81.5	114	171	80.8	112	167	4940	5918	6753	17611
Riverton Hts.	87.7	23	45	96.3	23	45	103.4	22	43	75.2	21	40	346	940	1310	2596
Salmon Creek	91.3	26	26	100.6	26	26	96.7	28	28	86.4	28	28	--	--	2743	2743
St. Bernadette	96.4	43	57	113.9	43	58	100.1	43	60	88.6	43	61	1570	1398	328	3296
White Center	117.2	55	64	117.9	55	65	113.1	55	65	111.5	55	64	--	1090	5701	6791
Total	83.9	825	1040	93.5	836	1114	95.7	838	1158	86.9	825	1152	14797	30345	30579	75721

% = Percent potential use. Percent use is based on an optimum of 62.5 hours per terminal for a four week month (2.5 hours/student/month X 25 students per terminal).
N = Number of students in one or more CAI programs.
E = Total enrollment in all CAI programs.

* End of first semester.

Table 2

STUDENT USE IN THE COMPUTER ASSISTED INSTRUCTION PROGRAM:
FINAL REPORT; 1976-1977

SCHOOL	September			October			November			December			January			February		
	N	ET	LDT	N	ET	LDT	N	ET	LDT	N	ET	LDT	N	ET	LDT	N	ET	LDT
Cascade Jr. Hi.	159	17.5	11.5	234	29.2	12.3	238	31.6	15.9	249	32.0	17.4	260	33.1	16.1	247	32.7	16.1
Glendale Jr. Hi.	57	23.3	7.7	61	27.0	13.9	68	30.0	15.5	67	28.7	18.2	79	34.0	16.5	74	32.3	17.2
Beverly Park	29	29.0	22.4	28	28.0	27.6	29	29.0	29.3	31	31.0	28.0	28	28.0	29.6	30	33.0	29.8
Hazel Valley	43	21.5	7.6	44	22.0	10.4	51	26.0	18.5	52	29.0	19.8	52	36.0	19.0	52	37.0	18.8
Hilltop	28	28.0	15.0	32	33.0	19.3	33	34.0	21.5	32	33.0	23.4	35	36.0	20.6	35	35.0	18.8
Mount View	113	23.9	10.9	114	24.0	18.7	108	23.2	19.1	111	24.0	19.3	107	23.2	18.5	106	24.3	18.3
Riverton Hts.	29	33.0	13.5	29	31.0	16.6	30	34.0	17.7	32	37.0	18.9	34	40.0	18.7	36	44.0	19.9
Salmon Creek	23	23.0	6.5	23	23.0	17.5	25	25.0	16.8	31	31.0	21.6	32	34.0	22.2	33	38.0	22.1
St. Bernadette's	36	45.0	27.1	36	44.0	20.8	36	46.0	23.2	36	46.0	21.8	35	49.0	23.1	35	50.0	19.9
Southern Hts.	34	36.0	6.7	44	46.0	17.8	45	47.0	23.1	42	44.0	20.5	45	47.0	18.9	46	48.0	21.8
White Center	52	26.0	22.9	53	26.5	25.2	51	25.5	25.7	59	29.5	26.8	61	30.5	25.7	55	25.5	26.3
Total	603	23.4	12.3	698	28.2	16.1	714	29.8	18.6	742	30.7	19.4	768	32.4	18.8	749	32.5	18.8

-15-

SCHOOL	March			April			May			SUMMARY/YEAR: Lessons				
	N	ET	LDT	N	ET	LDT	N	ET	LDT	Lang	Math	Read	Spell	Total
Cascade Jr. Hi.	254	33.8	14.8	247	33.9	16.7	255	32.8	14.6	3587	14255	2505	16	20363
Glendale Jr. Hi.	74	47.0	16.7	76	67.7	16.2	77	68.0	15.5	632	2885	2886	367	6770
Beverly Park	30	33.0	28.1	30	33.0	30.0	30	33.0	28.5	--	682	3799	--	4481
Hazel Valley	54	38.0	20.1	53	38.0	14.8	49	36.5	13.5	--	2163	2564	--	4727
Hilltop	35	36.0	18.7	39	40.0	18.1	39	40.0	20.4	--	1369	1538	--	2907
Mount View	110	24.8	20.2	112	25.5	18.4	107	25.0	21.6	--	9163	7555	--	16718
Riverton Hts.	37	46.0	20.5	37	46.0	20.1	37	46.0	20.7	--	1133	1622	--	2755
Salmon Creek	36	42.0	21.2	36	52.0	18.8	36	52.0	15.4	--	394	2344	--	2738
St. Bernadette's	35	50.0	19.3	35	50.0	19.6	35	50.0	16.9	1069	1930	196	--	3195
Southern Hts.	46	48.0	20.4	47	49.0	17.9	38	40.0	15.1	--	503	2289	--	2792
White Center	60	30.0	26.1	61	30.5	25.0	60	30.0	28.4	--	--	8297	--	8297
Total	771	35.1	18.9	773	38.0	18.3	763	37.1	18.1	5288	34477	35595	383	75743

N = Number of students in one or more CAI programs.

ET = Total enrollment per terminal in all CAI programs.

LDT = Lessons/Day/Terminal. Based upon 10-minute lessons/5 day week.

GOALS AND OBJECTIVES

The goals for Computer-Assisted Instruction with disadvantaged students are congruent with the Highline School District's Goals of Education that were developed in 1972 by a cooperative effort of the district and the Highline community. The major goal for CAI is:

> "To develop in each student competence in and appreciation for intellectual skills by assisting him to acquire basic learning skills and knowledge for new levels of understanding."

To meet this goal, several management objectives and student outcome objectives have been developed.

Management Objectives

Evaluation of the management objectives was based upon written documentation. This documentation will include; (1) listing of activities and dates of completion, (2) identification of services and system components, number of students served, and information and dissemination activities with parents and teachers.

Documentation in this report includes examples of various reporting formats that have been developed during the three years of operation. A description of each objective for each year and the yearly evaluation will appear in a later section of this chapter.

Student Outcome Objectives

The evaluation of the student outcome objectives was based upon data collected through pre- and posttests given to students on a fall and spring basis in ESEA Title I schools, and/or data collected through completion of objectives in the CAI course

material. These outcome objectives have been consistent throughout the project. Evaluation of these objectives will be summarized by the year in the project in later sections of this chapter.

Objectives

1. Students participating in mathematics classes supplemented by CAI will show one month's growth in computation skills for each month in the program as measured by a normative based standardized mathematics test and/or the Hewlett-Packard courseware for measuring student achievement of objectives.

   Objective 1 will be evaluated on a pre- and posttest of the computational subtests of a normative based standardized test for students enrolled on the computer terminals. Attainment of this objective will be mean student growth of at least 1.0 months for each month on the CAI system. (One month on the CAI system is the equivalent of 150 minutes interaction with a computer terminal.)

2. Students participating in language arts classes supplemented by CAI will show one month's growth in language usage skills for each month in the program as measured by a standardized language arts test and/or the CCC procedures for determining grade level achievement and gains in terms of months.

   Objective 2 will be evaluated on a pre- and posttest of the language mechanics subtest of a normative based standardized test for students enrolled on the computer terminals. Attainment of this objective will be evidence of students' mean achievement growth of at least 1.0 months for each month on the CAI system.

3. Students who are deficient in reading skills and are receiving CAI reading lessons will show one month's growth in reading skills for each month in the program as measured by a standardized reading test and/or the CCC procedures for determining grade level achievement and gains in terms of months.

   Objective 3 will be evaluated on a pre- and posttest of the reading comprehension subtest of a normative based standardized test for students enrolled on the computer

terminals. Attainment of this objective will be evidence of students' mean achievement growth of at least 1.0 months for each month on the CAI system.

4. Students using the computer terminals for CAI will have positive attitudes toward this experience as measured on a questionnaire designed to measure attitude toward computer learning by averaging 75 percent of the maximum possible positive attitude score on this questionnaire. This objective was not included in the project proposal for the 1976-1977 school year.

   Objective 4 will be evaluated on a post-only basis, using the CAI Program Evaluation Survey, an 11-item attitude survey developed by Seattle Pacific College and rewritten (1976) by the Highline School District. This survey was administered to CAI users in May of 1975 and 1976 on a post-only basis.

Other objectives specific to a particular year of the project will be defined in the respective sections of this chapter.

CAI Evaluation 1974-1975

Overview

The evaluation of the CAI project for the initial school year of 1974-1975 was prepared for the Highline School District by Dr. Max Jerman, Dr. Paul Schwada, and Dr. Peter Smith of Seattle Pacific College. The data was collected by the research and evaluation staff of the Highline School District from June, 1974, through March, 1975. The findings of the evaluators of the project operation through this period of time are presented in the following section of this chapter. Although reading was not included as a subject in the original proposal, when the availability of this curricular material become known, it was incorporated into the project and used extensively with students.

No achievement data is included for grades 10, 11 and 12, even though three terminals were used for eligible students at these grade levels at Evergreen High School. Problems encountered in the operation of the program at this site included:

1. Difficulty in achieving regularly scheduled lessons, due to the variety and flexibility of student activities and schedules.
2. The inappropriate level of the curricular materials resulting in a lack of student interest. (Elementary curriculum at the high school level.)
3. Unfavorable attitudes to school in general transferred to CAI.
4. High absenteeism among Title I eligible students at this level.
5. Frustration of faculty member involved in implementing the project at this site.

However, several students did utilize the program effectively with excellent results.

In addition, a program of adult basic skills was offered as part of an evening extension series through Highline Community College. This program led to the completion of the General Educational Development (GED) Exam for a high school diploma. Several adults in this program utilized courseware available through the CAI project to build their basic skills. The results were excellent and the availability of the program was well received by this group.

Evaluation of the Objectives

Management Objectives

1. To acquire the necessary computer hardware to operate a CAI program in Title I schools (5 elementary, 2 junior high, 1 senior high).

   A. Was the necessary equipment acquired?

      1. Was the H-P 2000F operational at the date expected?

         Evaluation: The system was operational at the date expected. There were a few problems with the hardware early in the year, but these were corrected without causing any serious difficulties in the operation of the project. The CAI network configuration is shown in Figure 1.

   B. Was the acquired equipment operationally adequate?

      1. Were response times acceptable?

         Evaluation: Under normal operating conditions, the two-second or less response time was achieved. Under initial student sign-on load response time was reported to be as much as 20 seconds. In general, however, the response time was within acceptable limits.

      2. Was the system down time less than five percent?

         Evaluation: Records indicate that system down time was approximately three percent. This was well within acceptable limits. A total of 27 hours of down time was reported.

3. Was the terminal equipment reliable?

Evaluation: The teletype terminals were not considered reliable. Many small problems requiring maintenance occurred. Service on teletypes was very poor. The local service man did not seem able to repair three "problem" machines. Same day service was available for the CRT terminals. Therefore, they were judged reliable. The major problem with the CRTs was frequent failure of the memory tube.

4. Was there loss of student time due to terminals in need of repair?

Evaluation: One hundred seventy-five user hours were lost on the 20 CRTs and 262 hours were lost on the 11 teletype terminals. This is equivalent to approximately 3 days of system time or approximately 2 percent of the school year. While any loss of time is troublesome, this is deemed to be within acceptable limits.

2. To acquire the necessary instructional programs and other software to operate a CAI system in the Title I schools.

A. Were the necessary programs acquired?

1. Were the mathematics and language arts programs acquired as planned?

Evaluation: Yes, both programs were acquired as planned. In addition, a reading program was also acquired and used in the project.

B. Were the programs adequate for instructional use in Title I schools?

1. Were the programs valid in terms of their content as judged by participating teachers?

Evaluation: The content was judged appropriate by teachers in the summer workshop. See the Preliminary Report for an additional statement. A follow-up questionnaire was given to faculty members in late April, 1975. The survey form showing the number of responses in each category is given on page 30.
The actual responses given to questions 11 and 12 are also included on pages 31-33.

As indicated, teachers evaluated the program very highly. The overall mean rating was 4.29 on a 1 to 5

scale. The item of most concern, although not ranked low, was item 7, which had to do with integrating the CAI program with teachers' daily instructional plans. Evidently teachers felt some difficulty integrating CAI and classroom instruction.

3. To provide inservice training to all teachers in the Title I schools who will be using CAI with their students.

   A. Was the inservice training program adequate?

      1. Was each participant in the inservice training program able to sign on the system, take a desired lesson, and obtain a desired teacher report?

         Evaluation: Each participant met the objectives of the workshop. Each participant demonstrated his ability to use the system's features correctly.

      2. Was each participant able to select CAI lessons appropriate to support stated instructional objectives?

         Evaluation: Yes. Participants prepared statements of objectives and planned to coordinate CAI lessons with their instruction. Participants worked through many lessons to familiarize themselves with the content.

      3. Did each participant demonstrate the ability to correctly assign each pupil to the appropriate starting point on the basis of test of achievement data?

         Evaluation: Yes. This was done in practice during the training session and discussed in detail.

      4. Did each participant develop a plan for integration of classroom work and CAI work of students?

         Evaluation: Yes. This was done both by individual teachers and by teams of teachers in schools which had more than one terminal.

4. To establish a consortium with Seattle Pacific College (SPC) for the purpose of training teachers and students of education in the utilization of CAI.

   A. Was a consortium established?

1. Were formal arrangements made?

Evaluation: No formal arrangements were made. Tentative agreements were reached, but actual work on consortium documents was not begun. This work remains to be done.

B. Did the consortium function as intended?

1. Were representatives appointed by the two parties?

Evaluation: No. No formal agreements were reached.

2. Were regular meetings held?

Evaluation: No. Two informal discussions were held during the year. Both agencies expressed an interest. Student-teacher interns are planned for the district next year as part of the regular internship program. However, no regular meetings were held for the purpose of establishing a consortium.

5. To develop, in consort with SPC, instructional programs beyond those commercially available to meet specific needs of students in the Highline School District.

A. Were curriculum writing teams established?

1. Were curriculum materials written?

Evaluation: No curriculum materials were written as planned. Interest in cooperatively developing programs in several areas was determined. However, due to the workloads of persons in both agencies, no materials were written. Arrangements for release time of faculty will be needed in order to encourage the development of programs. Most faculty members in the school or college do not have enough spare time or energy to develop programs in addition to their other duties.

6. To disseminate to the community a general understanding of the program.

A. Were dissemination meetings held for the community?

1. How many meetings were held?

Evaluation: No meetings were held specifically for dissemination purposes. However, the program was presented at Open House time in each school in the

fall of the year. Those parents who attended were told of the program.

2. Who attended?

   Evaluation: Only those parents who attended Open House meetings at each school in the fall of the year.

3. Did parents indicate an understanding of the program?

   Evaluation: Two hundred forty-five parents returned the CAI Program Evaluation Survey. On the basis of the returns, the indications are that:

   1. Most parents were familiar with the program.
   2. Nearly all parents were glad their child was selected for the program.
   3. Parents thought their children liked the program.
   4. More than half of the parents indicated students brought computer work home quite frequently.
   5. Nearly all parents thought their child understood how to do the computer lessons.
   6. Parents were of the opinion that the computer lessons contained the basic skills their child needed to know.
   7. More than half of the parents thought their child enjoyed school more because of the daily computer lessons.

   The number of parents responding to each item, 1 to 7, on the questionnaire is given on page 34, where a sample of the questionnaire is reproduced.

   The responses of parents to open-ended questions 8, 9, and 10 are recorded on page 35 following each question.

   In response to question 8, parents indicated that they would like to have their children get lessons in math, spelling, and reading. A number of parents indicated a preference for history and a few less preferred science. Many parents were not sure what courses they would like to see added to the system.

   Although only 49 parents indicated they had visited the CAI room, 117 indicated that while they did not, they would have liked to attend.

Eighty-four percent of the parents indicated they would like to have their children participate in the program again the following school year. This represents very substantial support of the program by parents. They apparently see value in the program for their children and want the program to continue.

Student Outcome Objectives

The evaluation of the previously stated student outcome objectives (page 17) is based upon data collected from student participation in the CAI project from June, 1974 through March, 1975.

Students were pretested in September, 1974, with the appropriate subtests and levels on the Comprehensive Tests of Basic Skills (CTBS) and posttested in March, 1975. The subtests administered were the Arithmetic Computation, Language Mechanics, and Reading Comprehension. Student gains on the CTBS are derived from scores from the pre- and posttests administered seven months apart. Tables 3, 4, 5, present the data for the student outcome objectives numbered 1, 2, and 3.

Objective No. 1. Mathematics

Table 3

Mean Grade Equivalent Score Gains,
Pre- Posttest on the CTBS; Arithmetic

Elementary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
5	33	.89	1.23
6	17	1.16	1.79
All elementary CTBS gains	50	.98	1.51

Secondary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
7	67	1.19	1.65
8	50	.50	.69
9	22	.82	1.13
All secondary CTBS gains	139	.88	1.36

Objective No. 2. Language

Table 4

Mean Grade Equivalent Score Gains,
Pre- Posttest on CTBS; Language Mechanics

Elementary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
5	90	1.95	2.70
6	76	1.18	1.64
All elementary CTBS gains	166	1.60	2.22

Secondary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
7	9	1.46	2.02
8	12	.50	.69
9	16	.62	.86
All secondary CTBS gains	37	.79	1.10

Objective No. 3. Reading

Table 5

Mean Grade Equivalent Score Gains,
Pre- Posttest on CTBS; Reading

Elementary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
5	88	.95	1.32
6	88	1.17	1.63
All elementary CTBS gains	176	1.06	1.64

Secondary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
7	43	.77	1.07
8	10	.63	.88
9	10	.80	1.11
All secondary CTBS gains	63	.75	1.04

Gains in reading were not as high as were those for either math or language arts, but were still well above the objectives set for the total project. The number of students reported represents only those students for whom complete data were obtained. Many more students were actually provided CAI in the project schools; the absence of pre- and posttest data did not permit the evaluators to include them in the achievement analysis.

For purposes of analysis, a month on CAI was defined as 2.5 clock hours at the terminal in a subject. This figure was arrived at by calculating the average amount of time scheduled at the terminal per student for each program over the six-month period of the study, allowing for absences, etc. Typically, students should have spent a minimum of 16 hours at the terminal during the study (10 minutes/day x 4 days/week x 4 weeks/month x 6 months) or 2.6 hours per month. The decision was made to have students take lessons only four days per week early in the project's development in order that other students could have access to the terminals each Friday. Mean time per student spent on each subject area was actually 8.5 hours or 3.4 months.

The evaluation of objective number 4 concerning student attitudes toward the program is reported on the following pages. In general, students had a positive attitude toward work on CAI terminals. Students reported liking to work on the computer (No. 2), reported that it was easier for them to learn on the computer (No. 8), reported that the lessons were just about right for them (No. 11), and found that working alone on the computer was not a problem (No. 16). Students were apparently not bothered a great deal by the noise of the teletype terminals (No. 9) and seemed to like doing math lessons on a computer slightly better than either reading or language arts (Nos. 4, 5, 6).

Most students reported that they felt their achievement scores had gone up (No. 14) and the majority reported that they liked school better this year because of the computer (No. 18).

The number of responses to each item is reported on a sample questionnaire on pages 36 and 37. It can be seen that although the majority of responses was positive, there were negative responses to each item. Clearly CAI did not satisfy the felt needs of every student. No single approach would do so. However, in the main, students' attitudes toward the program and their own achievement were positive. Some particular observations follow.

a. On a 5-point scale (5 = most favorable) students gave CAI a mean response of 3.99.

b. Older, higher grade-placement students gave CAI higher acceptance rating than younger, lower-placement students. Favorableness of rating was in inverse relationship to grade-equivalency gains, but not to CAI/month gains, as shown on the following page.

	Mean CAI Rating	Mean G.E. Gain (mos.)	CAI/Month Gain
Grades 5, 6	3.74	8.80	2.40
Grades 7, 8, 9 (Glendale)	4.13	6.71	2.53
Grades 10, 11, 12		gains not available	

c. A mean rating of 3.18 on question 11 shows that students felt the computer lessons are of a level of difficulty that is "just right." The mean of 3.22 for grades 5 and 6 on this question shows that younger students felt the lessons no more difficult than did those in junior high.

d. At no grade level did students find learning to use the computer (item 12) difficult. The mean rating of 3.81 indicates some feeling that learning computer use was even easier than desired.

e. Slightly more than 50% of the students checked reports on their achievement "a little bit" or "never." However, one must suppose that students were getting feedback, since 70% responding to question 14 indicated that they were aware of their progress as indicated by computer-provided reports.

Highline CAI staff indicated that classroom teachers received student achievement reports and shared data with students. This is supported by high approval

registered on the Faculty Survey for teacher reports provided (M = 4.69).

f. Parents' acceptance of CAI equals, or exceeds that of most students (M = 4.07).

   1. Lack of familiarity with the purpose of CAI was noticeable in the parent responses (M = 3.81 for question 1). But parents felt that their children enjoy school more because of CAI (M = 3.80), and they were clearly of the opinion that their children liked the program (M = 4.44). They expressed by a mean rating of 4.62 that their children know how to do the computer lessons.

   2. It is noteworthy that parents expressed a definite, but not overwhelming, belief that "the computer lessons contain most of the basic skills my child needs to know" (question 6) (M = 3.90).

g. As a group, the 44 responding faculty gave the highest rating to CAI of the three rating groups (M = 4.22). Least positive feelings expressed were those growing out of difficulty of integrating CAI and the teacher's instructional plan (M = 3.71). Faculty believed their students like the program (M = 4.14): that, in agreement with parents, the program contained the basic skills these students need; that their students gain a great deal from CAI (4.02). Thirty-five expressed a desire to have the program available next year, with five not sure and four not wanting it.

Conclusion

During the 1974-1975 school year the number of student users of the CAI program and respondents is presented in Table 6. Student use was excellent, however, more students should have been involved in the evaluation of the project. The student outcome objectives were met and there was generally a positive response to this method of building basic skills proficiency by students, parents, and faculty.

Table 6

All Faculty

CAI Program Evaluation Survey

Programs used by your students (Circle)

Math

Reading

Language Arts

General Educational Development (GED)

Career Information

Name _____

Date _____

Circle the number following each question which best represents your evaluation of the program.

		Agree 5	4	Not Sure 3	2	Dis-agree 1	No Resp.	Mean
1.	My students liked the program	17	17	7	2	0	1	4.14
2.	The program was at the right level for my students	22	19	2	0	1	0	4.39
3.	The program contained most of the basic skills my students needed	18	18	6	0	0	2	4.29
4.	The program was easy for my students to operate	21	15	5	2	0	1	4.28
5.	The reading level of the program was about right for my students	16	16	7	0	0	5	4.23
6.	The sequence of concepts or skills in the program was appropriate for the Title I students I have	23	10	10	1	0	0	4.25
7.	It was relatively easy to integrate the program with my instructional plan	14	15	3	7	3	2	3.8
8.	The teacher reports were adequate	31	10	1	2	0	0	4.59
9.	I believe my students learned a great deal from the program	14	19	5	2	0	0	4.02
10.	I would like to have the program available again next year	27	8	5	2	2	0	4.27

11. Another report I would like to have had is See the following page for comments. Nineteen people gave no comment to this item.

12. The program would have been better if: See the following page for additional comments.

HIGHLINE PUBLIC SCHOOLS

Faculty

CAI Program Evaluation Survey

11. Another report I would like to have had is_____

Individual reports in Reading and Language Arts. (2)

The skills which each student was working on so I could reinforce in class.

I believe some form of pre-testing and post-testing should be necessary. (4)

A comprehensive skills readout.

Daily percentages (2)

Changes in scores shown on reports.

Report to parents when student improves.

Weekly progress on students

Every 6th week report.

Reading for meaning as relates to various subjects. Directions for math, etc.; as relates to 5 W's in Journalism, topic sentence and paragraph development, etc.

No response - 31

HIGHLINE PUBLIC SCHOOLS

Faculty

CAI Program Evaluation Survey

12. The program would have been better if:

There should be an intermediate program between Language Arts and GED.

The students were more self directive. The level of the students was perhaps too low.

Highline teachers had written the programs to apply to their students.

I had high hopes for this program, but I'm not sure how much change has taken place that can be attributed to the students participation in CAI. Their attitude is rather "ho-hum" about it.

We hadn't been told we "had" to put a certain number on the terminals per day. One student being late made the following students lose part of their time on that terminal. Typical ivory tower planning with anticipated overkill.

I could have put more students on the program and in other areas.

It fit some of my children and helped them; other children grew discourage or goofed up on purpose.

I would like to have time available for average and above average students. (Rather difficult, however, with only one terminal.) I have enjoyed being in charge of the program. It is exciting to watch the improvement in most of the students.

It were not run for such a long period of time. The students resented having to miss class time "daily" to go on the computer. However, it has helped but definitely was too long.

I think one of the students in particular was getting tired of it--focusing in for 10 minutes a day is good self-discipline though.

I could have a copy of each lesson and their mistakes.

12. The program would have been better if: (cont.)

I think teachers should be given some form of a resume as to the kinds of things being done. I never felt I really knew the "how" or "what".

A teacher would become involved instead of having the machine.

The math program could give reports more similar to $RD and $LA; showing progress, not just blocks completed. I wish the $LA and $RD programs began at a lower level.

It could have begun on the second grade level.

Shorter period of time--like 3 or 4 hours, or 2 or 3 months maximum time.

It is too bad some above average students couldn't have used the computer too!

If I had understood what program was doing in more detail. Students had not moved in middle of hour, after all, my room is part of program too.

I had known in September what I know now.

The better students could have had access to the program.

It could be used for any level of students, not just remedial.

Only two days a week rather than four. Maybe a longer period on each of the two days would accomplish as much and be less of an interruption to the basic classroom.

More and different materials could be added to the reading and Language Arts programs.

No response - 19

Table 7

HIGHLINE PUBLIC SCHOOLS
All Parents
CAI Program Evaluation Survey

Your child was one of those selected to use a computer system for instruction in basic skills this school year. We would like to have your response to the questions below in order to help in our evaluation of the degree of success of this year's program.

Please respond by circling the number (1 to 5) following each statement which best represents your feeling about the program at this time.

	Agree 5	4	Not Sure 3	2	Dis-agree 1	No Resp.	Mean
1. I am familiar with the purpose of the Computer Assisted Instruction Program.	104	31	79	4	21	6	3.81
2. I am glad my child was selected for the program.	165	34	33	3	10	0	4.39
3. My son/daughter likes the program.	185	21	14	5	18	2	4.44
4. He/she frequently brings home computer lessons he/she has done.	109	22	22	18	62	12	3.42
5. My child understands how to do the computer lessons.	192	24	18	4	5	2	4.62
6. The computer lessons contain most of the basic skills my child needs to know.	111	27	79	10	12	6	3.90
7. My child enjoys school more because of the daily computer lessons.	120	28	54	12	30	1	3.80

8. What other kinds of lessons would you like to have put on the computer for your child to use? See page 35.

9. Have you ever visited the computer room at the school and worked on a sample lesson yourself? _____ Would you like to if you have not? See page 35.

10. Would you like to have your child continue with computer lessons again next year? See page 35.

Thank you for your help. Please have your child return this questionnaire to the computer supervisor in his/her school.

HIGHLINE PUBLIC SCHOOLS
All Parents

CAI Program Evaluation Survey

8. What other kinds of lessons would you like to have put on the computer for your child to use?

Anything of value for life ahead	3	Learning to follow instructions	1
Career information	1	Literature	1
Discipline	1	Math	20
Drama	1	Music	1
Drill	1	None	19
Ecology	1	Not sure or nothing	93
English	6	Reading	17
Games	1	Science	8
Geography	5	Skills	2
Grammar	2	Social Studies	1
History	11	Speech	1
Language Arts	4	Spelling	20
Language, Foreign	3	Writing	2

9. Have you ever visited the computer room at the school and worked on a sample lesson yourself?

No	200
Yes	49

Would you like to if you have not?

No	46
Yes	117
Not sure	46

10. Would you like to have your child continue with computer lessons again next year?

No	18
Yes	239
Not sure	26

Table 8

All Students

CAI Program Evaluation Survey

Name _____ Sex: M F

School _____ Grade: _____

CAI Program (Circle)

Reading — General Educational Development (GED)

Math

Lang. Arts — Career Information

We would like to know how you feel about computer assisted instruction at this time. We would like to have your honest and thoughtful answers to the questions below. There are no "right" or "wrong" answers. Simply circle the number that best shows how you feel.

How do you feel about:	Dislike Very Much 1	2	No Opinion 3	4	Like Very Much 5	No Resp.	Mean
1. Working on lessons using the computer?	35	33	90	189	352	10	4.13
2. Doing lessons on a teletype terminal?	29	32	125	123	296	104	4.03
3. Doing lessons on a TV screen terminal?	64	39	125	155	306	20	3.87
4. Doing math lessons using the computer?	48	30	105	127	287	112	3.96
5. Doing reading lessons using the computer?	43	31	108	93	236	198	3.88
6. Doing Language Arts using the computer?	50	21	154	76	116	292	3.45

Student Survey

	Not Much 1	2	No Opinion 3	4	A Lot 5	No Resp.	Mean
7. Do computer lessons help me with my classwork.	79	27	80	186	330	7	3.94
8. Is it easier to learn on the computer?	60	22	103	121	380	23	4.08
9. Does the teletype noise bother me?	376	28	89	42	71	103	2.02
10. Would I like to work on the computer more often?	111	26	71	103	384	14	3.90

	Too Hard 1	2	Just Right 3	4	Too Easy 5	No Resp.	Mean
11. For me the computer lessons are:	16	74	442	87	70	20	3.18
12. Learning to use the computer was:	17	29	237	156	220	50	3.81

13. Do you check the reports often to see how you are doing?

All the time 113 / Most of the time 218	331	A little bit 200 / Never 157	357	No Resp. 21	Mean 2.58

14. Do the reports show that achievement scores have:

Gone up 399 / Gone down 20	Stayed about the same 183	No. Resp. 106	Mean 1.37

	No 1	2	No Opinion 3	4	Yes 5	No Resp.	Mean
15. Do you learn more quickly using the computer?	60	29	97	101	407	15	4.10
16. Do you like working by yourself at the computer?	51	17	46	88	492	15	4.37
17. Has your ability to do school work improved this year?	23	24	118	130	394	20	4.23
18. Do you like school more this year than last year because of the computer?	96	18	115	86	368	26	3.90

Table 9

Summary: CAI Use and Response to Attitude Survey

School	CAI Use			Response to Survey		
	No. Student Users	No. Enrollments	No. Subjects in Study	No. Surveyed	No. Responses Returned	% Responses Returned
Elementary						
Students	437	583	221	261	226	87
Parents				92	91	99
Faculty				10	10	100
Secondary						
Students	731	979	239	448	435	97
Parents				69	68	99
Faculty				13	13	100
All Students						
Students	1168	1562	460	709	661	93
Parents				161	159	99
Faculty				23	23	100

The evaluation team made the following suggestions concerning the evaluation of the project in future years:

1. Extend the study by retaining students who were involved in 1974-1975 and add students picked up in March, 1975, posttesting.

2. Extend computer service to include monthly reports of achievement status, change in status, time-on-terminal, and number of lessons for month for each student. Provide summaries of this data by classes or treatment groups, grades, and schools.

3. Use above data to make monthly decisions about scheduling student interaction with programs.

4. Make total CAI resources available to elementary and junior high students.

5. Focus more effort on developing parents' understanding of the purpose of the Highline CAI Program and results of its use by students.

6. Use the information about CAI effectiveness to secure more active cooperation of classroom teachers in getting children to terminals on schedule.

7. Schedule terminal use to avoid taking students out of enrichment, high-interest classes such as art, music, drama, wherever possible.

8. Try to provide daily lessons for those students with the greatest need.

School Year 1975-1976

The CAI project entered its second year with several major changes and/or additions. As stated previously more schools were incorporated into the program, going from 8 in 1974-1975 to 10 in 1975-1976. The program was confined to grade levels 4 through 9 and several of the evaluator suggestions from the previous year were included into the project. The most notable of these was the monitoring of student usage (Table 2), the elimination of the high school program until more appropriate courseware was developed, and the development of student reports indicating daily student progress, initial starting level, and student growth (see Appendix A, Exhibits 10, 11, 12, 13, 14, 15). In addition, a more uniform reporting of student progress to parents was developed (see Appendix B).

The evaluation of the management and student outcome objectives was based upon written information submitted by the project manager throughout the year.

Evaluation of Management Objectives

Objective 1: To make the Computer-Assisted Instruction system available to Title I schools. The distribution of computer terminals and related equipment will be reevaluated in order to implement this.

Evaluation: Evaluation of the previous year's CAI program indicated that program effectiveness was minimal at the senior high level. Consequently, the three terminals there were made available for other schools. Also, it was determined that optimum output could be maintained with two less terminals

at Cascade Junior High and one less at Mount View Elementary. Prior to the end of the school year a memo was sent to all Title I principals notifying them of the availability of terminals and indicating the type of commitment and use that should be involved if they desired to begin or add to their CAI component. Within the size limitations of the computer system and using the input from the schools, the network was revised to obtain maximum use and efficiency for this school year.

Objective 2: To exchange existing terminals for more suitable equipment in order to:

a. Have terminals that have a higher degree of productivity and reliability, and

b. Maintain existing costs on all terminals, reducing costs where possible.

Evaluation: New CRT terminals (Infoton Vistar/GT) were obtained this year under a lease purchase plan. Compared with those of last year, the Infotons have twice as many lines displayed, cost the same on a monthly basis, and have needed only one fifth the service calls. Teletypes are rented this year from RCA Service Company. As compared to those of last year, these rent for $7.00 less per terminal, have needed one-third the service calls, and are maintained on a regular basis insuring minimal loss of student terminal time.

Objective 3: To provide inservice training for all teachers and aides new to the program.

Evaluation: Inservice training was provided on August 28, 1975, for all teachers and aides new to the program. At this session, items relative to the curriculum and management of the program were covered. Additional training was given on August 29th and September 4th to those new to the program who would be assuming the role of proctor. Technical information and operation of the equipment and software was covered in detail. Additional

followup training is provided by the CAI manager on a weekly basis.

Objective 4: To enroll an average of at least 25 students per terminal.

Evaluation: The total enrollment in the various CAI programs has met or exceeded the minimum of 25 student enrollments per terminal every month with an overall average of 33.2 student enrollments per terminal for the total school year.

Objective 5: To maintain an average of at least 18 students interacting with each terminal per day.

Evaluation: The average number of students interacting with each terminal per day has met or exceeded the minimum of 18 every month except September. There is an overall average of 21.3 students interacting with each terminal per day over the school year.

Objective 6: To upgrade the information system to keep teachers and parents aware of the progress made by each student on the system.

Evaluation: In addition to the standard reports provided by the program authors (Exhibits 1-9 in Appendix A), the Highline CAI staff has written additional programs which give daily student progress on a lesson by lesson basis and also a summary of student growth (Exhibits 10-15 in Appendix A). These reports are printed and delivered to each school on a regular weekly basis. Samples of these reports may be examined in Appendix A and include the following:

Exhibit 1. Student Usage Rosters
Exhibit 2. Mathematics Usage Roster
Exhibit 3. Mathematics Progress Report
Exhibit 4. Individual Mathematics Student Report

Exhibits 5-7. Course History Reports
Secondary Levels 1-3

Exhibit 8. Reading Group Report
Exhibit 9. Language Arts Group Report
Exhibit 10. Reading Starting Level Report
Exhibit 11. Reading End-of-Lesson Report
Exhibit 12. Reading Progress Report
Exhibit 13. Language Arts Starting Level Report
Exhibit 14. Language Arts End-of-Lesson Report
Exhibit 15. Language Arts Progress Report

The above listed reporting forms provide immediate and discrete information on students' starting levels and progress in the several CAI programs in which they are participating.

In addition to the system of reporting progress to the teacher, a system for informing the individual parents of this progress has been developed. These reports are in the format of letters from the principal and Title I teacher to the parent. Examples of these letters are to be found in Appendix B and include the following:

Exhibit 1. Mathematics Progress Report - Parent
Exhibit 2. Reading Progress Report - Parent
Exhibit 3. Language Arts Progress Report - Parent

These letters provide information to the parent relating to their child's achievement in specific basic skills. The letters are informative and positive in nature and serve the accomplishment of those management objectives which relate to a parent information system.

Evaluation of Student Outcome Objectives

The final evaluation of the previously stated student outcome objectives is based upon data reflecting student performance on the CAI system from September 15, 1975, through May 15, 1976.

It should be noted that Title I students who were assigned to work on the CAI terminals had lower mean pretest scores on the Stanford Achievement Tests at all grade levels and in each of the three areas covered by CAI than other students in the general Title I program. This applies to all three areas: Reading, Language Arts, and Mathematics as presented on the CAI system. The gains made by CAI students exceeded those made by non-CAI Title I students and brought both groups to approximately the same grade placement at the end of the year.

Two measures of student gains are presented in this evaluation for each of the first three objectives. These are: (1) Mean gains as measured by pre- and posttest sections of the Stanford Achievement Tests in Reading, Language Arts, and Mathematics; and, (2) CAI growth as measured by the C.C.C.* authors' procedures for determining grade level achievement. Student gains on the Stanford Achievement Tests are derived from pre- and posttests administered eight months apart, while gains on the CAI materials are representative of nine months on the system. The following evidence of gains as measured by the two sets of data will be presented to show gains prorated for the entire nine-month school year and gains per month in the program.

Tables 10, 11, 12 and 13 present the data for Student Outcome Objectives Nos. 1, 2, and 3.

---

* Computer Curriculum Corporation

Objective No. 1. Mathematics

Table 10

MEAN GRADE EQUIVALENT SCORE GAINS,
PRE-POSTTEST ON THE SAT: ARITHMETIC

Elementary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
4	7	1.35 years	1.50 months
5	25	.79 years	.88 months
6	31	1.69 years	1.88 months
All Elementary SAT Gains	63	1.29 years	1.44 months

Secondary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
7	38	.79 years	.87 months
8	54	1.01 years	1.12 months
9	35	1.35 years	1.50 months
All Secondary SAT Gains	127	1.04 years	1.15 months

Objective No. 2. Language

Table 11

MEAN GRADE EQUIVALENT SCORE GAINS,
PRE-POSTTEST ON THE SAT: LANGUAGE

Elementary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
4	None	--	--
5	19	1.24 years	1.38 months
6	17	1.80 years	2.00 months
All Elementary SAT Gains	36	1.34 years	1.49 months

Secondary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
7	None	--	--
8	15	2.03 years	2.25 months
9	20	1.46 years	1.62 months
All Secondary SAT Gains	35	1.70 years	1.89 months

Objective No. 3. Reading

Table 12

MEAN GRADE EQUIVALENT SCORE GAINS,
PRE-POSTTEST ON THE SAT: READING

Elementary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
4	29	1.46 years	1.62 months
5	33	1.35 years	1.50 months
6	80	1.24 years	1.38 months
All Elementary SAT Gains	142	1.31 years	1.45 months

Secondary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
7	58	1.01 years	1.11 months
8	19	1.01 years	1.11 months
9	19	1.35 years	1.50 months
All Secondary SAT Gains	96	1.08 years	1.21 months

Table 13

CAI STUDENT GROWTH ON CCC* AUTHORS' PROCEDURES

	No. of Students	Gain/Year in Program	Gain/Month in Program
Objective No. 1. Mathematics			
Elementary Gains: Grades 4, 5, 6	63	1.31 years	1.45 months
Secondary Gains: Grades 7, 8, 9	127	1.31 years	1.46 months
Objective No. 2. Language			
Elementary Gains: Grades 4, 5, 6	36	4.11 years	4.56 months
Secondary Gains: Grades 7, 8, 9	35	3.50 years	3.89 months
Objective No. 3. Reading			
Elementary Gains: Grades 4, 5, 6	142	1.13 years	1.25 months
Secondary Gains: Grades 7, 8, 9	96	1.26 years	1.40 months

*Computer Curriculum Corporation

The final evaluation of Objectives No. 1, No. 2, and No. 3 in the areas of Mathematics, Language and Reading, respectively, is based upon the previously stated objectives. These have within them two common criteria for the achievement of the objectives. These are:

1. A minimum gain of at least one month grade equivalent score on the Stanford Achievement Test for each month on the CAI system.
2. At least one month's gain for each month on the CAI system according to criteria set by C.C.C.* CAI program standards.

These criteria have been met or exceeded in each basic skill area covered with the exception of Arithmetic at the 5th and 7th grades.

There was very close correspondence between the gains made in Objectives Nos. 1 and 3--Mathematics and Reading--between scores on the SAT and criteria established to show gains for C.C.C.* materials. The gains shown on the CAI package as presented by C.C.C.* for Language are two to three times as great as those measured by pre-posttest on the SAT. These materials will be re-examined to attempt to produce a closer correspondence with normative based standardized tests. However, the C.C.C.* materials do yield indication of exceptional gains in the CAI Language program.

---

*Computer Curriculum Corporation

Objective No. 4: CAI Program Evaluation Survey

An eleven item questionnaire was designed to measure attitudes toward computer learning and administered to students using the CAI computer terminals. Two additional questionnaires were developed and administered--one for faculty involved with the CAI program and the other for parents of students using CAI terminals. Data from these three questionnaires are included in the evaluation of Objective No. 4. The questionnaires were given to the students, faculty and parents during the month of May, 1976. The actual questionnaires with the mean response values follow as "Student Survey, Table 16," "Faculty Survey, Table 14," and "Parent Survey, Table 15." On each of these tables the mean response position is represented by a typed-in asterisk on the response scale. In addition, the actual mean response values are added as an additional column along the righthand border of the program evaluation survey.

The criterion for achievement of these objectives was that students would demonstrate "an average 75% of the maximum possible positive attitude score on this questionnaire." The criterion value, therefore, should be 3.75 for questions having 5 response positions, and 2.25 for questions having 3 response positions. However, there are some items that are not directly related to the criteria for this objective. These are related to the initiative of the individual student to examine his individual student reports and the taking home of reports for his parents to see.

It is likely that on a 5-point Likert scale of the kind that was used in our survey, a more reasonable objective would be to accept as a criterion for success mean values that are beyond the middle position, that is, number 3 or the "fence straddling" position. This would permit the examination of positive attitudes vs. negative attitudes and also the examination of general trends.

Processing of the survey data included the calculation of mean response values and chi-squares. The chi-square calculations were based upon the assumption that the expected number of responses for each cell or response position would be equal. That is, that the respondent would be just as likely to mark 1 as he would 2, 3, 4, or 5. An additional run was made on these values assuming that a normal distribution of responses should occur, however, these values are not used or reported in this evaluation, as the final outcome was essentially the same.

In all cases, the magnitude of chi-square was great enough to show a confidence level of .01 or better, thus indicating that the mean values derived are acceptable.

Student Responses. Generally, the mean values for the student responses met or approached the criterion established for the student questionnaire. The indication was that the students like to work on the computer, that the lessons help them to do their classwork better, and it was easier to learn on the computer. In addition, students would like to spend more time working on the lessons on the computer and believe that they learn more quickly using the computer. They also indicate that the computer lessons are just about "right" for them as learners and that learning to use the computer was not difficult.

Faculty Responses. The responses from the faculty who were involved with computer assisted instruction at both the elementary and secondary levels are very positive. The mean combined responses of these two groups are at or above 4.0 in every case with chi-square values of such a magnitude that the level of confidence exceeds the .01 level.

The faculty responses indicated a high level of interest in the CAI program and satisfaction with the program in general.

Parent Responses. The first 7 items on the parent survey are built around a Likert type scale. The responses to these 7 items meet or exceed the criteria established for the student questionnaire and are significant at or beyond the .01 level of confidence, thus indicating a high level of parent satisfaction with the computer assisted instruction program. Item number 8 corresponds directly with item number 8 on the student survey which speaks to the students' progress reports. The mean value for students indicating that they had taken reports home for their parents to see was 2.82. The parents' mean response to the question, "How many reports of your child's progress have you seen this year?" is 2.86.

Summary. The three survey questionnaires that were developed and administered to students, faculty and parents as described above indicated a high level of satisfaction with the CAI program. Faculty interest and satisfaction with the program was especially high and indicated that the program has satisfied a need in providing additional instruction, particularly tutorial, for Title I students in their classes.

Table 14

HIGHLINE PUBLIC SCHOOLS

Program Evaluation Survey

Computer Assisted Instruction

FACULTY

School _____

Which programs have your students used? Mathematics Language Arts Reading

Circle the number following each statement which best represents your opinion of the program.

	No	Probably Not	Not Sure	Somewhat	Yes	Mean
1. My students like working on the computer.	1	2	3	4	5	4.57
2. The program is easy enough for my students to operate.	1	2	3	4	5	4.74
3. The program contains the basic skills that my students need.	1	2	3	4	5	4.80
4. The program is at about the right level for my students.	1	2	3	4	5	4.78
5. The sequence of concepts or skills in the program is appropriate for this level of student.	1	2	3	4	5	4.49
6. It is relatively easy to integrate the program with my instructional plan.	1	2	3		5	4.00
7. The teacher reports are adequate.	1	2	3	4	5	4.20
8. I receive the reports often enough.	1	2	3	4	5	4.37
9. I believe that most of my students have significantly improved in the basic skills that they have worked on with the computer.	1	2	3	4	5	4.61
10. I would like to have the program available again next year.	1	2	3	4	5	4.80

11. Is there another kind of report you would like? _____ What kind? _____

_____

12. The program would be better if: _____

_____

THANK YOU FOR YOUR TIME.

4/76

Total response to Faculty Survey, N = 46

Table 15

HIGHLINE PUBLIC SCHOOLS

Program Evaluation Survey

Computer Assisted Instruction

PARENT

Your child has been using a computer system for instruction in basic skills this past school year. We would like to have your response to the questions below in order to help our evaluation of this year's program.

Please respond by circling the number 1 through 5 that follows each statement which best represents your opinion about the program at this time.

	No	Probably Not	Not Sure	Somewhat	Yes	Mean
1. I am familiar with the purpose of the Computer Assisted Instruction Program.	1	2	3	(4)	5	3.77
2. I am glad that my child was selected to work in this program.	1	2	3	4	(5)	4.50
3. My child seems to like the program.	1	2	3	(4)	5	4.33
4. My child brings home or talks about his/her computer lessons.	1	2	3	(4)	5	3.76
5. My child seems to understand how to do the computer lessons.	1	2	3	4	(5)	4.70
6. The computer lessons seem to deal with things my child needs to learn.	1	2	3	(4)	5	4.22
7. My child seems to enjoy school more because of the daily computer lessons.	1	2	3	(4)	5	3.73
8. How many reports of your child's progress have you seen this year?	0	1	2	(3)	more than 3	2.86

9. Besides the present Reading, Language Arts, and Mathematics lessons, what other kinds of lessons would you like to have for your child's use? _____

10. Have you ever visited this program at your school? * Have you ever worked a sample lesson? ** If you have not, would you like to? ***

11. Would you like to have your child continue with this program again next year?

Yes 244 No 25 I don't know 70 No response 14

Thank you for your help. Please have your child return this survey to the computer supervisor in your school.

4/76

* Yes 122, No 208, No response 27

** Yes 59, No 248, No response 44

*** Yes 138, No 76, No response 143

Total response to Parent Survey, N = 353

Table 16

HIGHLINE PUBLIC SCHOOLS

Program Evaluation Survey

Computer Assisted Instruction

STUDENT

School _____ Sex: M F Grade _____

Program: $M1 $M2 $LA $RD

We would like to know how you feel about working on the computer. We would like to have your honest answers to the questions below. There are no "right" or "wrong" answers. Just circle the number that best shows your feelings.

	Not At All	Not Much	?	A Little	A Lot	Mean
1. Do you like working on the computer?	1	2	3	4	5	3.90
2. Have the computer lessons helped you to do your classwork better?	1	2	3	4	5	3.70
3. Is it easier to learn on the computer?	1	2	3	4	5	3.87
4. Would you like to spend more time working lessons on the computer?	1	2	3	4	5	3.42
5. Do you learn more quickly using the computer?	1	2	3	4	5	3.74
6. Do you like school more this year than last year?	1	2	3	4	5	3.59
7. How often have you looked at the student reports to see how you are doing?	1	2	3	4	5	2.94
8. Did you take any of the reports home for your parents to see?	1	2	3	4	5	2.82
9. Do the reports show that your scores have gone up?	1	2	3	4	5	3.86

	Too Hard	Just Right	Too Easy	
10. The computer lessons are:	1	2	3	2.14
11. Learning how to use the computer was:	1	2	3	2.38

THANK YOU FOR GIVING US YOUR TIME.

4/76

Total response to Student Survey, N = 600

SUMMARY

The Highline School District Title I CAI program has completed its second year of implementation. The management objectives have in every case been met or exceeded. Student and teacher involvement in the program have increased remarkably. There are increased requests, and even sometimes demands, from buildings not currently involved in the CAI program for future participation. In buildings currently having the CAI program, questions are arising about the increase in services for the next year.

Student outcomes as indicated by the number of students using the terminals, the number of lessons completed and gains in Reading, Language Arts and Arithmetic have far exceeded our expectations. The conditions set for the first three specific student outcomes, or learning objectives, have been met or exceeded for each learning area specified. And, student, faculty and parent attitudes about the CAI program have been especially positive. The Highline Computer Assisted Instruction Project has been highly successful according to objective data as well as our own subjective observations.

The program manager for the computer assisted instruction program in Highline, teachers and aides who assist the students, and the students themselves are responsible for this program's success.

School Year 1976-1977

The funding of the CAI project for the third year was unprecedented in the State of Washington. Due mainly to the success of the previous two years, the program has indicated its success in aiding teachers to build basic skill proficiency in ESEA Title I eligible students.

Few changes in the project were made in view of the excellent results during the 1975-1976 school year. The changes that were made reflected an ongoing evaluation of the project by the manager, the Highline School District research and evaluation staff, and the Title I staff. The changes that were made included: (1) The relocation of terminals into buildings that had indicated from the previous year a great need and high student usage, (2) The development of new methods of monitoring usage to reflect student usage (see Table 2), and (3) The development and piloting of a drill and practice program in spelling.

The evaluation of the CAI project for the 1976-1977 school year is based upon documentation presented in written form by the project manager through June, 1977. The evaluation of the student outcome objectives (stated previously) was by pre- and posttest data collected from September, 1976, through May, 1977.

Evaluation of Management Objectives

Objective 1: Each school using the CAI program will maintain a minimum of 25 student enrollments for each terminal.

Evaluation: Reports were supplied to the Highline School District Department of Research and Evaluation monthly to verify that in excess of 25 students were enrolled per terminal. In fact, for the nine months of the school year there were an average of 31.9 students enrolled per terminal. See Table 2 for a summary of this report.

Objective 2: Each school using the CAI program will maintain an average monthly minimum of 20 student lessons per school day on each terminal.

Evaluation: This objective was written prior to the change from a 6-hour student school day to a 5-1/2-hour student school day at the elementary level and a 5-hour student school day at the secondary level. To reflect this change the minimum daily usage was adjusted to 18 lessons per terminal per day at the elementary level and 16 lessons per day per terminal at the secondary level.

Reports were supplied monthly, November through June to the Highline School District Department of Research and Evaluation indicating that these minimums were being met or surpassed. When schools were below this minimum an attempt was made by the project manager to increase the usage at the participating school and/or explain the decline. To meet the criterion of this objective successfully a mean of 17.1 lessons per day per terminal is necessary. This level was exceeded each month spoken to in the proposal. The mean number of lessons per day per terminal for this past year was 17.7. See Table 2 for a summary of this report.

Objective 3: Over the school year the percent of "down time" for the total system and each component part thereof will not exceed 3% as compared to total school time.

Evaluation: A down-time log was kept by the CAI manager and reviewed by the evaluators in February and June of this school year. There was no student time lost due to failure of the Hewlett-Packard 2000F and a total of 140 student hours lost due to failures in the terminals. Comparing this with the total student hours available (5-1/2 hours/day x 170 days/year x 13 terminals = 26,010 student hours available) we find that the down time was approximately 1/2 of one percent--far less than the 3% level indicated in the objective.

Objective 4: The Title I teacher will be provided with weekly reports indicating individual student usage of the CAI system, level of achievement by strand or block, and cumulative progress by strand or block.

Evaluation: The manager of the CAI project maintained a log of reports delivered to the schools at the beginning of each week. Copies of this log were supplied to the Highline School District Department of Research and Evaluation to verify that this objective was met. Each week beginning with October 4, 1976 and continuing through June 10, 1977 the following reports were delivered where appropriate:

Student Usage, Exhibit 1, Appendix A
Mathematics Progress Report, Exhibit 3, Appendix A
Reading Group Report, Exhibit 8, Appendix A
Reading End-of-Lesson Report, Exhibit 11, Appendix A
Reading Progress Report, Exhibit 12, Appendix A
Language Arts Group Report, Exhibit 9, Appendix A
Language End-of-Lesson Report, Exhibit 14, Appendix A
Language Arts Progress Report, Exhibit 15, Appendix A

Every other week a Mathematics Student Report (Exhibit 4, Appendix A) was delivered. When requested additional reports were supplied to aid teachers in planning individual student programs.

Objective 5: Each parent or guardian of a student taking lessons on the CAI program will receive a minimum of three reports during the 1976-1977 school year. These reports will indicate student progress on each CAI component in which the student is enrolled.

Evaluation: The program manager interviewed the Title I staff in each participating school in December, 1976, and March, 1977, and June, 1977, concerning parental reports. The object was met in all cases except one with either a parent conference or a parent letter. There was no formal districtwide letter use as there was in 1975-1976. The Title I staff preferred reports tailored to fit the program in each building.

Objective 6: The Highline CAI staff will provide two days of inservice training relative to curriculum and management of the CAI program for all teachers and aides new to the program.

Evaluation: The project manager held inservice training on three days; August 30, 1976, September 14, 1976, and September 24, 1976, to meet the needs of the various staff commitments. Copies of the agendas for the workshop and a list of staff members present are provided on pages 61-65.

COMPUTER ASSISTED INSTRUCTION
TEACHERS' and PROCTORS'* WORKSHOP
EVERGREEN HIGH SCHOOL
830 S.W. 116th STR.
SEATTLE, WA.

A G E N D A

August 30, 1976

9:00-9:15	INTRODUCTIONS OF PERSONNEL
9:15-10:00	EXPLANATION AND FAMILIARIZATION OF THE COMPUTER EQUIPMENT
10:00-10:45	EXAMINATION AND FAMILIARIZATION WITH THE TECHNICAL MANUALS
10:45-11:45	FAMILIARIZATION AND HANDS-ON EXPERIENCE WITH THE FUNCTIONS NECESSARY TO OPERATE THE COMPUTER AND THE COMPUTER TERMINALS
11:45-12:00	SERVICING AND TROUBLE-SHOOTING THE EQUIPMENT
12:00-1:00	LUNCH
1:00-2:00	EXAMINATION OF THE CURRICULUM PACKAGES IN READING, LANGUAGE ARTS, MATHEMATICS, AND GED
2:00-2:30	STUDENT INTERACTION WITH THE CURRICULAR MATERIALS -A HANDS-ON EXPERIENCE-
2:30-3:00	EXPLANATION, INTERPRETATION, AND UTILIZATION OF STUDENT REPORTS
3:00-3:30	HANDS-ON EXPERIENCES WITH THE LESSONS AND REPORTS IN C.A.I.

* PROCTOR - The teacher or teacher's aide who is directly responsible for the operation of the computer system and computer terminals.

COMPUTER ASSISTED INSTRUCTION
TEACHERS' and PROCTORS' WORKSHOPS
HIGHLINE SCHOOL DISTRICT
1976-1977

August 30, 1976 A.M. (Evergreen High School C.A.I. system)

NAME	SCHOOL	POSITION
Howard Call	Evergreen	Teacher
Jay Davis	District	Manager-C.A.I.
Dick Heritage	Evergreen	Aide
Barbara Birch	District	Director of Title I
Lou Gestner	District	Reading Consultant

August 30, 1976 P.M.

NAME	SCHOOL	POSITION
Howard Call	Evergreen	Teacher
Dick Heritage	Evergreen	Aide
Dr. Ferry Fischer	Evergreen	Principal
Barbara Birch	District	Director of Title I
Beverly Weise	Evergreen	Teacher
Virginia Nerheim	Evergreen	Teacher
Harriette Fredenberg	Evergreen	Teacher
Karen Sayers	Evergreen	Counselor

COMPUTER ASSISTED INSTRUCTION
TEACHERS' and PROCTORS'* WORKSHOP
CASCADE JR. HIGH SCHOOL
11212 10th AVE. S. W. RM. 302
SEATTLE, WA.

A G E N D A

September 14, 1976 (All staff and aides)

9:00-9:30	AN OVERVIEW OF COMPUTER ASSISTED INSTRUCTION	
9:30-11:15	EXAMINATION AND EXPLANATION OF THE CURRICULUM PACKAGES	
	9:30-10:15	LANGUAGE ARTS
	10:15-10:35	READING
	10:35-10:45	BREAK
	10:45-11:15	MATHEMATICS
11:15-12:00	FAMILIARIZATION AND INTERPRETATION OF STUDENT REPORTS	
12:00-12:30	LUNCH	
12:30-1:00	EXPLANATION OF THE HIGHLINE COMPUTER AND COMPUTER NETWORK	
1:00-1:30	LOG ON AND LOG OFF PROCEDURES-HANDS ON EXPERIENCE	
1:30-2:00	ACCESS AND UTILIZATION OF THE MANAGEMENT PROGRAMS	
2:00-2:15	BREAK	
2:15-2:40	HANDS ON EXPERIENCE IN USING THE MANAGEMENT PROGRAMS	
2:40-3:00	TROUBLE-SHOOTING PROBLEMS WITH THE COMPUTER TERMINALS	

* PROCTOR - The teacher or teacher's aide who is directly responsible for the operation of the computer terminal.

COMPUTER ASSISTED INSTRUCTION
TEACHERS' AND AIDES' WORKSHOP
EDUCATIONAL RESOURCES & ADMINISTRATIVE CENTER
15675 AMBAUM BOULEVARD S.W.
SEATTLE, WA.

A G E N D A

September 24, 1976 (White Center Elementary Staff)

1:00-1:30 EXPLANATION OF THE HIGHLINE COMPUTER AND COMPUTER NETWORK

1:30-3:00 EXAMINATION AND EXPLANATION OF THE CURRICULUM PACKAGES

- 1:30-2:00 LANGUAGE ARTS
- 2:00-2:30 READING
- 2:30-3:00 MATHEMATICS

3:00-3:30 FAMILIARIZATION AND INTERPRETATION OF STUDENT REPORTS

COMPUTER ASSISTED INSTRUCTION
TEACHERS' and PROCTORS' WORKSHOPS
HIGHLINE SCHOOL DISTRICT
1976-1977

September 14, 1976 (Attendence roster C.A.I. schools-Title I)

NAME	SCHOOL	POSITION
Mel Frank	Hilltop	Teacher
Marilyn Klewin	Hilltop	Aide
Evelyn Hammett	Southern Hts.	Teacher
Gordon Sargent	Glendale	Teacher
Betty West	Glendale	Aide
Kim Lester	Glendale	Teacher
Dan Hallstrom	Cascade	Teacher
Audrey Bright	Cascade	Aide

September 24, 1976 (Attendence roster White Center Elementary-Title I)

NAME	SCHOOL	POSITION
Elsie Norman	White Center	Teacher
Norma Ross	White Center	Teacher
Ginger Martin	White Center	Aide
Debbie Kiehn	White Center	Aide

Evaluation of Student Outcome Objectives

The evaluation of the first three student outcome objectives stated previously is based upon data collected by means of a pre- and posttest reflecting student growth while working in the CAI program from September, 1976, through May 13, 1977. To arrive at mean gains in reading and mathematics the grade equivalent scores for the reading comprehension and mathematics computation subtests of the Stanford Achievement Test were used. No pre-posttest data is available for language arts, as it was not a component tested in the Title I schools this year. A second measure of growth reported utilizes the curricular techniques embedded in the courseware developed by Hewlett-Packard Corporation for mathematics and Computer Curriculum Corporation (CCC) for reading and language arts. This method of determining student growth is incorporated into the proposal for the 1976-1977 program in place of the pre- and posttest data. However, since both are available for mathematics and reading, both will be reported.

The pre- to posttest student gains are derived from tests administered eight months apart, while gains measured through the use of the CAI courseware represent nine months in the program. In order to equate these two measures, both results are adjusted to represent an entire school year's growth and gains per month in the program. Tables 17, 18, 19 and 20 present the data for the student outcome objectives numbered 1, 2, and 3 for the school year 1976-1977.

Objective No. 1. Mathematics

Table 17

Mean Grade Equivalent Score Gains;
Pre- Posttest on the SAT: Arithmetic

Primary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
2	15	1.38 years	1.44 months
3	34	2.13 "	2.37 "
All Primary SAT Gains	49	1.90 "	2.09 "

Intermediate

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
4	49	2.50 years	2.78 months
5	36	1.75 "	1.58 "
6	18	1.00 "	1.11 "
All Intermediate SAT Gains	103	1.98 "	2.24 "
All Elementary SAT Gains	152	1.95 "	2.19 "

Secondary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
7	77	1.63 years	1.81 months
8	44	1.75 "	1.94 "
9	42	1.50 "	1.67 "
All Secondary SAT Gains	163	1.63 "	1.81 "

Objective No. 2. Language

Table 18

Mean Gains as Determined by
Procedures for Measuring Student
Achievement Developed by CCC*

Secondary

	No.	Gain/ Year in Program	Gain/Month in Program
All Secondary CCC* Gains	73	4.07 years	4.52 months

Note: No pre-posttest data available.

*Computer Curriculum Corporation

Objective No. 3. Reading

Table 19

Mean Grade Equivalent Score Gains
Pre-Posttest on the SAT: Reading

Primary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
2	4	1.88 years	2.09 months
3	9	2.00 "	2.22 "
All Primary SAT Gains	13	1.96 "	2.18 "

Intermediate

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
4	61	1.63 years	1.47 months
5	56	2.00 "	2.22 "
6	75	1.88 "	2.09 "
All Intermediate SAT Gains	192	1.83 "	1.93 "
All Elementary SAT Gains	205	1.84 "	1.96 "

Secondary

Grade	No. of Students	Gain/Year in Program	Gain/Month in Program
7	47	1.88 years	2.09 months
8	15	2.63 "	2.92 "
9	20	1.63 "	1.81 "
All Secondary SAT Gains	82	1.95 "	2.17 "

Table 20

CAI Student Growth as Measured by
the Curricular Materials: H-P* and CCC**

Objective No. 1. Mathematics	No. of Students	Gain/Year in Program	Gain/Month in Program
Elementary Grades 2, 3, 4, 5, 6	196	1.06 years	1.18 months
Secondary Grades 7, 8, 9	205	1.20 "	1.33 "
Objective No. 2. Language Arts			
All Grade Levels 2 through 9	73	4.07 "	4.52 "
Objective No. 3. Reading			
Elementary Grades 2, 3, 4, 5, 6	258	.93 "	1.03 "
Secondary Grades 7, 8, 9	84	1.11 "	1.23 "

* Hewlett Packard - Mathematics
** Computer Curriculum Corporation - Reading and Language Arts

Objective No. 4. Attitude Survey

This objective was not included as a part of the proposal for the 1976-1977 school year. However, the project manager and Title I staff member who have worked closely with the CAI program have reported that student, teacher, and parent attitudes remain positive toward the CAI program. In addition, several parents have chosen to move their students from a non-Title I school to a Title I school for the purpose of enrolling the student in CAI.

In several instances students have requested enrollment in the CAI program when they felt a need to build upon their basic skills. At Cascade Junior High, where records were kept, less than two percent of the students enrolled in the program could not function successfully.

The demand for inclusion of the CAI program into other ESEA Title I schools and the expansion in the participating schools have exhausted the capacity of the existing hardware. A new system has been installed at Evergreen High School with eight terminals presently being used. This system contains more extensive courseware at a higher level and has provided excellent results in its first year of operation with an entirely new staff. This system can be expanded to 32 terminals as it is or up-graded to carry 96 terminals. The acceptance of CAI at the high school level with this new, more mature, courseware has been excellent.

Summary

The third year of operation for the Highline School District Title I CAI program has produced the most outstanding results of the three years in the project. All management objectives were met or exceeded. The utilization of the program by students surpassed that of the previous year even though there was a drop of 16% in the amount of time students were in school (from a 6-period day to a 5-period day). The demand for terminals continued to be greater than the space available. Teachers, both Title I and regular classroom, are becoming more involved with the program and more aware of the curricular materials. This interest and involvement is evidenced in the greater gains as reported in the student outcome objectives.

The results of the gains indicated by the pre- to posttest SAT data again exceeded those expected. Students at lower grade levels were included in the program with outstanding success, especially in the mathematics area.

Developmental work began this year on additional curricular materials as evidenced in the piloting of the spelling program at two schools. In each case the teacher involved has reported excellent acceptance of the new courseware.

The objective data along with the subjective information available indicates that the 1976-1977 CAI program was highly successful. The indication, from this data, that good classroom teaching supplemented with CAI drill and practice utilizing learning objectives is an extremely viable method of raising basic skills levels in Title I eligible students.

Review

Beginning the summer of 1974, Highline School District initiated an ESEA Title I program in Computer Assisted Instruction. The program was funded through a Title I, Part B, special incentive grant plus some Title I, Part A, district funds. During the three years of operation, several changes have taken place, but by and large it has been a time of learning how to use a new visual approach to aiding classroom instruction. In general, each year of operation the management objectives set aside in the yearly proposal have been accomplished. In most cases the suggestions for improving the program have been incorporated the following year. This has been accomplished with a minimum of program staff (less than 9% of the program budget is allocated to manage the program).

Techniques were developed for monitoring use of the terminals and reporting the level of usage. Where changes in participating schools were warranted these changes were made to insure the maximum use of the available time. Because of this and the fact that teachers became involved with the program, the student usage increase each year of the project continued in spite of the shortening of the student day. This level of student use has enabled the CAI program to become extremely cost effective as a supplemental program. Over the three years the cost per pupil per year has held at about $100, which compares very favorably with the $300 to $400 cost per pupil for other ESEA Title I funded supplemental programs. It should be noted that in following years the cost of continuing the program will be less than $50 per pupil per year.

Each year of the project the student outcome objective of one month's growth per month in the program, listed earlier, has been met or exceeded in every case (Tables 21, 22, 23). Another indication of the viability of the program is indicated in that

each successive year the program was expanded to include lower grade levels while the student outcomes continued to increase. There seems to be an indication that familiarity with the program, its objectives, and the courseware on the part of the CAI staff and participating teachers has helped to enable students to make greater gains.

Objective 1. Mathematics

Table 21

Mean Grade Equivalent Score Gains,
Pre-Posttest: Arithmetic

Elementary

Year of Operation	Test Used	No. of Students	Grade Levels	Gain/Year in Program	Gain/Month in Program
1974-1975	CTBS	50	5, 6	.98 years	1.51 months
1975-1976	SAT	63	4, 5, 6	1.29 "	1.44 "
1976-1977	SAT	152	2, 3, 4, 5, 6	1.95 "	2.19 "

Secondary

Year of Operation	Test Used	No. of Students	Grade Levels	Gain/Year in Program	Gain/Month in Program
1974-1975	CTBS	139	7, 8, 9	.88	1.36
1975-1976	SAT	127	7, 8, 9	1.04	1.15
1976-1977	SAT	163	7, 8, 9	1.63	1.81

Objective No. 2. Language Arts

Table 22

Mean Grade Equivalent Score Gains,
Pre-Posttest: Language Arts

Elementary

Year of Operation	Test Used	No. of Students	Grade Levels	Gain/Year in Program	Gain/Month in Program
1974-1975	CTBS	166	5, 6	1.60 years	2.22 months
1975-1976	SAT	36	4, 5, 6	1.35 "	1.49 "
1976-1977		No data available			

Secondary

Year of Operation	Test Used	No. of Students	Grade Levels	Gain/Year in Program	Gain/Month in Program
1974-1975	CTBS	37	7, 8, 9	.79 years	1.10 months
1974-1976	SAT	35	7, 8, 9	1.70 "	1.89 "
1976-1977		No data available			

Objective No. 3. Reading

Table 23

Mean Grade Equivalent Score Gains
Pre-Posttest: Reading

Elementary

Year of Operation	Test Used	No. of Students	Grade Levels	Gain/Year in Program	Gain/Month in Program
1974-1975	CTBS	176	5, 6	1.06 years	1.64 months
1975-1976	SAT	142	4, 5, 6	1.31 "	1.45 "
1976-1977	SAT	205	2, 3, 4, 5, 6	1.84 "	1.96 "

Secondary

Year of Operation	Test Used	No. of Students	Grade Levels	Gain/Year in Program	Gain/Month in Program
1974-1975	CTBS	63	7, 8, 9	.75 years	1.04 months
1975-1976	SAT	96	7, 8, 9	1.08 "	1.21 "
1976-1977	SAT	82	7, 8, 9	1.95 "	2.17 "

A new CAI system developed by CCC and funded through Title I, Part A, building funds was in operation at Evergreen High School for the 1976-1977 school year. The curricular materials are appropriate for more mature students and the CAI staff sees an indication that continued improvement in the achievement levels for these students is in order. This system presently operates with eight terminals and can be expanded to 32 for only the cost of the terminals. The evaluator, in reviewing the courseware on this system, recommends that this system be expanded to include the secondary ESEA Title I school while the increased demands at the elementary level be met with the Hewlett-Packard system.

Initially it was felt that the student interest in CAI would decline as the computer become "old stuff." As indicated, Table 26, there was some decline from the school year 1974-1975 to 1975-1976. However, the decline was not significant and even though no attitude surveys were administered in the final year of the project, the staff members and participating teacher have indicated that the interest remains high.

Table 24

Highline School District

Program Evaluation Survey - CAI*

Faculty

	1974-1975	1975-1976
My students like working on the computer.	4.14	4.57
The program was easy for my students to operate.	4.28	4.74
The program contained the basic skills my students needed.	4.29	4.80
The program was at about the right level for my students.	4.39	4.78
The sequence of concepts or skills in the program was appropriate for this level of student.	4.25	4.49
It was relatively easy to integrate the program with my instructional plan.	3.80	4.00
The teacher reports were adequate.	4.59	4.20
I believe that most of my students have significantly improved in the basic skills that they have worked on with the computer.	4.02	4.61
I would like to have the program available next year.	4.27	4.80

*Key: 1 = no, 2 = probably not, 3 = not sure, 4 = somewhat, 5 = yes.

Table 25

Highline School District

Program Evaluation Survey - CAI*

Parent

	1974-1975	1975-1976
I am familiar with the purpose of the CAI program.	3.81	3.77
I am glad my child was selected for the program.	4.39	4.50
My child seems to like the program.	4.44	4.33
My child brings home or talks about his/her computer lessons.	3.42	3.76
My child seems to understand how to do the computer lessons.	4.62	4.70
The computer lessons seem to deal with things my child needs to learn.	3.90	4.22
My child seems to enjoy school more because of the daily computer lessons	3.80	3.73

*Key: 1 = no, 2 = probably not, 3 = not sure, 4 = somewhat, 5 = yes.

Table 26

Highline School District

Program Evaluation Survey - CAI*

Student

	1974-1975	1975-1976
Do you like working on the computer?	4.13	3.90
Have the computer lessons helped you do your classwork better?	3.94	3.70
Is it easier to learn on the computer?	4.08	3.87
Would you like to spend more time working lessons on the computer?	3.90	3.47
Do you learn more quickly on the computer?	4.10	3.74
Do you like school more this year than last because of the computer?	3.90	3.59
How often have you looked at the student reports to see how you are doing?	2.58	2.94
Do the reports show that your scores have gone up?	1.37	3.86
The computer lessons are**	3.18	2.14
Learning to use the computer was**	3.81	2.38

*Key: 1 = not at all, 2 = not much, 3 = ?, 4 = a little, 5 = a lot.

**Key: 1 = too hard, 2 = just right, 3 = too easy.

The faculty and parent attitudes toward the program have generally shown an increase over the year. During the past year several students have enrolled into participating schools, through open enrollment, in order to participate in the project. In addition, several parental and student requests have been received and honored where it was felt that help could be given.

The information obtained through this project has been disseminated to many throughout the State of Washington. On more than ten occasions the CAI staff and/or the staff of the Highline School District's Department of Research and Evaluation have made, at the district's expense, presentations to educational groups, university classes, and commercial groups. In all cases the information has been presented in a "come-see-us" way to make people aware of the results of the project. Many communications have been made inviting parents to visit the program. No definite count has been made as to the number of persons visiting the program, however, according to the CAI staff, several hundred people have viewed CAI over the past three years.

As indicated in the data presented in this document, the evaluators have found the Highline School District's Computer Assisted Instruction program to be a viable method of building basic skills with Title I eligible students. The open approach that has been taken to this project by the Highline School District central administration, Department of Research and Evaluation, Title I administration and principals, Parent Advisory Council, and participating teachers is to be commended. It is the opinion of the evaluators that the program should be continued and, when it is economically possible, expanded to provide service to more Title I eligible students.

APPENDIX A

STUDENT REPORTING SYSTEM

Student Usage Rosters

BEVERLY PARK ELEM. 28 JUN. 1976 8:50 AM PORT NO. 9

ID LISTING PAGE 1

ID	NAME	PREFERRED LANGUAGE	TYPING MULT.	ENROLLED COURSE	USAGE (HRS)
1000	, DONNA	ENG	1	$RD	29.5
1001	BILL	ENG	1	$RD	22.2
1002	WENDY	ENG	1	$RD	25.4
1003	RY	ENG	1	$LA	24.8
1004	, ROBIN	ENG	1	$RD	26.3
1005	TINA	ENG	1	$RD	22.7
1006	LLOYD	ENG	1	$LA	26.0
1007	CHRIS	ENG	1	$LA	23.4
1008	PAUL	ENG	1	$RD	10.9
1009	, VICKY	ENG	1	$RD	25.0
1010	, ADA	ENG	1	$RD	20.8
1011	, TINA	ENG	1	$RD	10.0
1012	, TODD	ENG	1	$RD	22.6
1013	RAMONA	ENG	1	$RD	30.6
1014	PETE	ENG	1	$LA	18.2
1016	, LORI	ENG	1	$RD	21.7
1017	K, CRAIG	ENG	1	$RD	21.7
1018	PAM	ENG	1	$RD	23.5
1019	STEVEN	ENG	1	$RD	20.1
1021	AMY	ENG	1	$RD	19.3
1022	CARLA	ENG	1	$RD	23.3
1023	TOM	ENG	1	$RD	23.7
1024	, JAMES	ENG	1	$RD	26.4
1025	, VAL	ENG	1	$RD	27.6
1026	TYLER	ENG	1	$RD	22.7
1027	STUART	ENG	1	$RD	20.3
1028	PAUL	ENG	1	$RD	22.8
1031	, KELLY	ENG	1	$RD	15.2
1032	SHELLEY	ENG	1	$LA	15.5
1033	, JANET	ENG	1	$LA	9.7
1034	THRESA	ENG	1	$RD	12.5
1035	TIM	ENG	1	$RD	12.8

Exhibit 2

Mathematics Usage Roster

Indicates the cumulative time at the terminal.

CASCADE JR. HIGH 2 MAR. 1976 9:11 AM PORT NO. 56

$M2 USAGE ROSTER: LOREE 4 PAGE 1

ID	NAME	USAGE (HRS)
1020	RESA	14.6
1019	LES	15.7
1000	TONY	12.7
1001	RET	12.1
1013	ATHY	14.7
1002		6.1
1150	, D.J.	10.2
1030		9.8
1265	LAINE	6.4
1032	HANN	13.0
1162		7.4
1005	M	15.3
1006	RRY	15.7
1007	VICKIE	15.7
1008	ED	15.0
1036	Y	10.3
1009	USS	13.8
1010	E	13.9
1012	MARTY	12.6
1039	N	14.0
1014	OTT	13.9
1015	DAVID	15.4
1016	IZ	14.3

Exhibit 3

Mathematics Progress Report

CASCADE JR. HIGH 28 JUN. 1976 8:26 AM PUKT NU. 7

$M2 PROGRESS REPORT LOREE 4

CURRENT MAIN LESSON YR	BL	LEVEL	BC	DP	CURRENT REVIEW LESSON YR	BL	LEVEL	NAME
2	11	2	29	108	2	6	4	TERESA
2	15	5	34	144	2	13	3	'ARLES
3	12	TEST	51	121	3	8	4	S, TONY
3	5	3	24	102	2	21	5	GARET
2	17	3	36	115	2	12	TEST	KATHY
1	21	3	20	74				'F
3	5	TEST	39	111	2	21	4	)N, D.J.
1	24	5	23	90	1	19	4	.E
2	7	TEST	21	39				BLAINE
2	12	1	31	112	1	20	4	JOHANN
1	15	3	14	52	1	12	TEST	1
3	9	3	28	138	3	6	TEST	'AM
3	9	TEST	48	140	3	5	5	'ERRY
2	21	3	40	140	2	17	2	', GARY
2	14	TEST	33	116	2	9	3	'RED
1	24	TEST	23	104	1	20	2	'DY
2	21	TEST	40	127	2	17	TEST	RUSS
3	9	TEST	48	127	3	5	5	LE
2	20	4	19	97	2	11	5	, MARTY
2	23	TEST	42	129	2	21	4	ON
3	24	TEST	64	125				COTT
3	24	TEST	44	122	3	15	3	DAVID
2	8	TEST	27	99	1	21	4	LIZ
1	8	TEST	7	21	1	5	3	N, TIM

(YR=YEAR BL=BLOCK BC=BLOCKS COMPLETED DP=DAYS PRESENT)

Exhibit 4

Individual Mathematics Student Report

Indicates lesson blocks already completed and the corresponding posttest scores.

CASCADE JR. HIGH 2 MAR. 1976 9:24 AM PORT NO. 24

$M2 STUDENT REPORT LOREE 4

STUDENT: MARTY SCHNEIDER

LAST 17 BLOCKS COMPLETED

LEVEL	BLOCK	SCORE	# REVIEWS
2	17	100	0
2	16	90	0
2	15	90	0
2	14	100	0
2	13	70 ***	0
2	12	75 *	0
2	11	70 **	1
2	10	95	0
2	9	90	0
2	8	95	0
2	7	95	0
2	6	95	0
2	5	85	0
2	4	85	0
2	3	95	0
2	2	100	0
2	1	100	0

STUDENT REPORT FOR WHICH ID NUMBER?//STOP

DONE

Exhibit 5

Course History Report: Secondary Level 1

CASCADE JR. HIGH 28 JUN. 1976 8:16 AM PORT NO. 9

$M2 COURSE HISTORY REPORT REGULAR STUDENTS

*YEAR 1

BLOCK	# STU.	PRE-TEST AVG.	PRE-TEST S.D.	POST-TEST AVG.	POST-TEST S.D.	INCREASE AVG.	INCREASE S.D.
1	45	90.0	7.1	95.8	5.3	5.9	6.9
2	45	87.1	10.2	94.7	5.6	7.6	8.4
3	45	94.4	6.7	96.7	5.3	2.2	5.9
4	46	90.0	9.7	94.1	7.4	4.1	6.9
5	44	78.5	14.6	83.5	12.6	5.0	14.9
6	127	90.7	7.0	93.9	5.3	3.2	7.8
7	126	86.9	10.6	89.6	9.8	2.6	10.1
8	133	91.5	7.9	95.1	4.9	3.6	6.7
9	132	93.4	8.7	96.5	5.0	3.2	8.0
10	128	80.7	11.7	85.1	11.7	4.4	12.5
11	125	88.6	8.6	92.3	7.0	3.7	7.6
12	146	89.2	11.7	94.2	9.0	5.0	9.9
13	135	87.8	9.5	92.6	6.0	4.9	8.2
14	136	87.7	11.7	91.3	12.5	3.6	11.5
15	128	86.9	10.2	91.1	8.3	4.2	9.1
16	115	73.0	12.7	78.0	12.0	5.0	12.2
17	106	88.1	8.2	91.6	6.4	3.4	8.3
18	105	89.6	10.5	92.7	10.4	3.0	10.8
19	101	91.1	6.8	90.9	8.3	-0.2	7.5
20	96	78.8	10.9	86.1	10.7	7.3	11.2
21	93	79.4	12.3	85.2	11.4	5.9	13.3
22	88	90.6	5.6	95.4	4.0	4.8	5.1
23	85	82.6	13.4	90.2	10.7	7.6	13.0
24	81	92.2	6.0	94.4	4.4	2.3	6.7

Exhibit 6

Course History Report: Secondary Level 2

CASCADE JR. HIGH 28 JUN. 1976 8:21 AM PORT NO. 9

$M2 COURSE HISTORY REPORT REGULAR STUDENTS

YEAR 2

BLOCK	# STU.	PRE-TEST AVG.	PRE-TEST S.D.	POST-TEST AVG.	POST-TEST S.D.	INCREASE AVG.	INCREASE S.D.
1	108	84.9	11.4	93.1	7.5	8.3	10.6
2	88	89.7	7.2	94.6	5.0	4.9	8.1
3	66	92.0	5.3	96.0	2.5	4.0	5.2
4	59	82.2	10.3	90.7	7.7	8.5	9.8
5	127	90.9	4.8	92.1	4.6	1.2	5.5
6	121	89.5	8.6	92.9	6.6	3.3	7.9
7	117	91.9	5.8	93.4	5.1	1.6	6.3
8	85	86.5	6.7	89.7	4.8	3.2	7.5
9	102	76.4	12.7	80.9	14.6	4.6	15.2
10	99	92.5	6.5	96.0	4.7	3.5	6.9
11	94	80.7	12.4	86.5	9.1	5.8	10.9
12	87	79.5	14.5	84.0	13.0	4.5	14.5
13	81	75.7	11.2	78.5	14.0	2.9	12.9
14	81	88.1	7.9	93.0	7.0	4.9	9.0
15	73	91.3	5.5	92.0	5.4	0.7	5.2
16	71	93.4	3.9	95.5	3.2	2.1	4.3
17	68	80.2	13.1	83.7	13.6	3.5	13.0
18	62	80.7	12.9	85.9	9.1	5.2	10.6
19	61	94.7	4.8	95.2	5.1	0.5	6.3
20	57	84.6	7.7	89.6	4.7	5.0	7.7
21	51	78.3	16.3	84.0	11.3	5.7	13.1
22	47	95.4	3.4	96.1	4.4	0.8	4.6
23	44	76.6	14.9	85.7	11.6	9.1	14.2
24	40	92.3	4.1	92.5	3.6	0.2	4.1

Exhibit 7

Course History Report: Secondary Level 3

CASCADE JR. HIGH 28 JUN. 1976 8:22 AM PORT NO. 9

$M2 COURSE HISTORY REPORT REGULAR STUDENTS

YEAR 3

BLOCK	# STU.	PRE-TEST AVG.	PRE-TEST S.D.	POST-TEST AVG.	POST-TEST S.D.	INCREASE AVG.	INCREASE S.D.
1	6	93.8	3.2	97.0	1.9	3.1	4.1
2	6	94.1	2.0	93.0	3.4	-1.1	2.2
3	5	88.0	6.6	84.1	9.2	-3.9	14.5
4	5	88.6	3.4	93.2	3.0	4.6	4.6
5	40	83.7	12.6	88.1	10.5	4.5	10.5
6	38	87.9	8.5	88.1	11.9	0.2	11.3
7	38	89.4	7.0	94.8	4.8	5.4	7.5
8	37	83.6	11.9	88.7	9.4	5.1	11.9
9	32	90.4	6.8	94.0	4.6	3.7	6.5
10	32	74.6	14.0	86.9	9.4	12.3	15.8
11	29	86.2	7.6	90.8	6.3	4.6	7.5
12	28	78.1	10.4	85.4	11.3	7.3	12.4
13	27	82.9	10.6	88.5	9.6	5.6	11.0
14	25	82.9	9.3	89.3	9.5	6.3	11.1
15	23	67.2	16.6	76.1	14.9	8.9	14.7
16	23	98.1	2.9	99.7	1.3	1.6	2.7
17	23	98.3	4.0	99.7	1.4	1.4	3.4
18	19	77.8	17.8	80.8	14.7	3.0	16.2
19	18	88.9	13.1	93.7	9.5	4.8	9.5
20	15	94.9	3.5	95.5	2.6	0.6	4.3
21	15	92.8	4.1	94.7	2.7	2.0	3.7
22	14	92.7	3.3	95.0	2.9	2.4	4.9
23	13	92.1	2.9	94.9	4.3	2.8	4.7
24	13	94.1	3.6	94.6	3.6	0.5	4.6

Exhibit 8

Reading Group Report

WHITE CENTER ELEM. 28 JUN. 1976 8:28 AM PORT NO. 9
READING 3-6 GROUP REPORT GLAVIND

HR/MN	Y	T	BS	WA	VOC	LC	IC	WS	ID	NAME
16/57	3	0	.	3.8	4.3	5.0	4.0	4.0	1021	JESS
22/53	3	1	.	3.7	4.1	4.7	.	3.9	1013	ROBBY
24/29	3	0	.	5.4	5.4	5.5	5.4	5.1	1035	WILLI
23/06	3	0	.	4.1	4.7	5.2	4.5	4.4	1024	RICKY
26/11	3	0	.	6.1	6.1	6.1	6.0	5.6	1022	DEBBI
24/02	3	0	.	4.7	4.7	4.8	4.6	4.6	1023	ADRIA
24/20	3	0	.	5.2	5.4	5.4	5.3	5.0	1025	DAVID
07/50	3	0	.	4.8	4.8	4.8	4.8	4.8	1055	TERRE
05/39	3	0	.	4.2	4.3	4.2	4.2	4.2	1017	KIM C
26/14	3	3	.	5.4	5.4	5.5	5.5	5.4	1020	DANNY
24/51	3	5	.	5.2	5.2	5.2	5.2	5.1	1019	ROBBI
15/56	3	2	3.4	.	.	.	.	.	1028	CARRI
29/22	3	1	.	5.4	5.4	5.4	5.2	5.3	1006	DIANA
29/21	3	0	.	5.2	5.2	5.3	4.9	4.9	1027	DONNA
23/10	3	0	.	4.7	4.8	4.6	4.5	4.6	1014	VANES
30/20	3	0	.	5.5	5.7	5.6	5.4	4.7	1026	BILLY
18/20	3	0	.	3.9	4.5	5.1	.	3.9	1001	HARRI
22/21	3	0	.	5.7	5.6	5.6	5.5	5.6	1029	LADEA
22/20	3	0	.	5.9	5.9	5.9	5.8	5.6	1016	MARLA
23/43	3	0	.	3.8	4.2	4.9	4.0	4.0	1030	WILLI
20/44	3	0	.	4.7	4.9	4.8	4.6	4.5	1007	CATHY
17/30	3	0	.	5.2	5.2	5.2	5.2	5.2	1015	JANIC
21/31	3	0	.	4.8	4.8	4.8	4.6	4.7	1031	GEORG
22/46	3	0	.	4.9	5.1	5.1	4.9	5.0	1018	PERRY
25/33	3	0	.	4.3	4.9	5.9	4.2	4.3	1009	DIANA
24/06	3	0	.	3.9	4.5	5.0	4.3	4.2	1008	LISA
17/51	3	1	.	4.8	4.8	4.7	4.7	4.5	1003	CHARL
19/39	3	2	.	3.8	4.2	4.7	4.0	4.1	1002	MARK
28/49	3	0	.	3.8	6.6	7.0	4.0	4.0	1043	SANDY
25/53	3	0	.	5.6	5.6	5.6	5.6	5.5	1032	DEBBI
21/42	3	1	.	3.8	4.2	4.8	4.0	4.0	1010	JEFF
18/10	3	0	.	4.6	4.6	4.6	4.6	4.5	1004	JEFF
06/50	3	0	.	3.6	3.7	3.9	.	3.7	1054	ARTY
25/03	3	0	.	5.4	5.5	5.6	5.4	5.5	1011	MARY
20/13	3	0	.	5.5	5.5	5.5	5.4	5.2	1033	ANITA
24/41	3	0	.	5.1	5.2	5.2	5.1	5.0	1034	ROBIN
08/50	3	0	.	4.2	4.2	4.1	4.2	4.2	1042	TONY
24/00	3	0	.	4.0	4.6	5.2	4.3	4.2	1012	CURTI
25/40	3	2	.	6.1	6.1	6.1	6.1	5.9	1036	DONNA
23/43	3	0	.	5.9	5.9	6.0	5.9	5.9	1039	JANIC
15/11	3	0	.	4.9	4.9	4.9	4.8	4.6	1005	LOUIS
26/25	3	1	.	6.5	6.6	6.6	6.6	6.4	1037	TAMMY
21/47	3	0	.	5.2	5.3	5.3	5.2	5.1	1038	DAVID

30/20	3	5	3.4	6.5	6.6	6.6	6.6	6.4	HIGH	
05/39	3	0	3.4	3.6	3.7	3.9	4.0	3.7	LOW	
21/34	3	0	3.4	4.8	5.0	5.1	4.9	4.7	AVG	

Exhibit 9

Language Arts Group Report

MOUNT VIEW ELEM. #1 28 JUN. 1976 8:39 AM PORT NO. 9

LANGUAGE ARTS 3-6 GROUP REPORT ----- 5 BOYS

	AVG	TO	1/A	2/B	3/C	4/D	5/E	6/F	7/G	8/H	ID/TM	NAME
L	100	0	100								1011	
S	5.8	1	4.6	5.9	5.8	6.1	6.4	6.1	5.9	0.0	10/54	
L	100	0	100								1139	
S	6.8	0	7.0	6.6	6.5	7.0	7.0	7.0	7.0	0.0	16/51	
L	95	0	95								1002	
S	5.1	0	4.8	5.7	4.9	5.2	5.6	4.8	5.3	0.0	14/ 1	
L	80	1	80								1054	
S	6.5	0	6.2	6.8	5.8	6.3	7.0	6.7	6.7	0.0	16/59	
L	90	0	90								1021	
S	5.3	1	4.8	5.5	4.9	5.2	5.9	5.5	5.4	0.0	14/21	
L	100	0	100								1025	
S	6.3	2	6.5	6.5	5.6	6.8	5.8	6.3	6.7	0.0	20/ 0	
L	100	0	100								1136	
S	6.0	1	6.1	6.3	5.0	6.2	6.1	6.5	6.3	0.0	13/38	
L	85	0	85								1109	
S	5.2	0	4.8	5.2	4.9	5.4	6.4	4.8	5.3	0.0	10/33	
L	100	0	100								1042	
S	6.3	1	6.6	6.6	5.7	6.6	7.0	6.1	5.9	0.0	18/13	
L	100	0	100								1060	
S	4.5	1	4.1	4.4	4.4	4.8	5.1	4.5	4.6	0.0	8/17	
L	95	0	95								1043	
S	6.8	2	7.0	6.7	6.5	7.0	7.0	7.0	7.0	0.0	23/10	
L	85	0	85								1045	
S	6.7	2	7.0	6.6	6.1	6.8	7.0	6.8	7.0	0.0	15/43	
L	80	1	80								1030	
S	6.6	2	6.4	6.6	6.4	6.7	6.9	6.7	6.9	0.0	22/19	
L	70	0	70								1018	
S	5.1	0	4.8	5.7	4.9	5.1	5.6	4.8	5.1	0.0	14/34	
L	95	0	95								1047	
S	6.8	0	6.6	6.8	6.3	6.9	7.0	7.0	7.0	0.0	21/ 2	
L	95	1	95								1031	
S	5.8	3	5.5	6.2	5.6	5.9	6.3	5.8	5.8	0.0	21/34	
L	95	0	95								1009	
S	5.7	0	5.3	5.6	5.6	5.6	7.0	5.6	5.7	0.0	14/32	

Exhibit 10

Reading Starting Level Report

Indicates the achievement level of each student
after the preliminary placement lessons early in the year.

```
RUN
READ

                STARTING LEVEL INFORMATION FOR CAI $RD PROGRAM

 STD NO          NAME          TIME(MIN)     1     2     3     4     5

  1023            ICKY             140      4.0   4.0   4.0   4.0   4.0
  1022            NG, DEBBIE       127      4.0   4.0   4.0   4.0   4.0
  1001            A, CHRIS         133      4.0   4.0   4.0   4.0   4.0
  1007            DAN              132      4.5   4.5   4.5   4.5   4.5
  1011            DENNIS           122      3.5   3.5   3.5   0.0   0.0
  1013            DESTRY           123      4.0   4.0   4.0   4.0   4.0
  1015             PAT             127      0.0   0.0   0.0   0.0   0.0
  1004             DIANA           123      5.0   5.0   5.0   5.0   5.0
  1017            NEIL             125      4.0   4.0   4.0   4.0   4.0
  1020            , TAMMY          130      4.0   4.0   4.0   4.0   4.0
  1000            EE, JAMES        127      0.0   0.0   0.0   0.0   0.0
  1009            J, LUPE          133      4.5   4.5   4.5   4.5   4.5
  1005            NTHY             121      4.0   4.0   4.0   4.0   3.9
  1010            IM               127      3.5   3.5   3.5   0.0   0.0
  1002            JM               121      4.5   4.5   4.5   4.5   4.5
  1006            ETA              132      0.0   0.0   0.0   0.0   0.0
  1008            MY               132      4.0   4.0   4.0   4.0   4.0
  1003            SANDY            125      4.0   4.0   4.0   4.0   4.0
  1014            , MIKE           130      3.5   3.5   3.5   0.0   0.0
  1021             KEVIN           129      3.5   3.5   3.6   0.0   0.0
  1012            CHET             133      3.5   3.5   3.5   0.0   0.0
  1019             PAT             130      4.0   4.0   4.0   4.0   4.0
  1018             PAT             138      0.0   0.0   0.0   0.0   0.0
  1024            , KARI           129      3.5   3.6   3.6   0.0   3.6
  1016             JEANNE          133      0.0   0.0   0.0   0.0   0.0
                END OF REPORT

DONE
```

Exhibit 11

Reading End-of-Lesson Report

$RD END-OF-LESSON REPORT
WHITE CENTER ELEM. 28 JUN 76

NO.	NAME	LAST EIGHT LESSONS TOTAL PROBLEMS / PERCENT RIGHT							
1021	EZ	37	28	33	0	0	0	0	0
		100%	89%	94%	0%	0%	0%	0%	0%
1013		25	19	19	20	0	0	0	0
		52%	79%	68%	70%	0%	0%	0%	0%
1035	SY	33	27	36	27	33	29	32	26
		79%	78%	86%	96%	100%	76%	84%	85%
1024	.EY	36	43	41	31	35	36	39	32
		86%	86%	83%	84%	97%	83%	82%	81%
1022	)W\ER	39	41	43	38	40	47	44	45
		85%	98%	95%	92%	83%	89%	91%	76%
1023	;ER	30	39	37	27	30	32	32	0
		83%	74%	76%	85%	83%	78%	81%	0%
1025	;ON	23	27	21	24	18	24	28	21
		61%	85%	81%	92%	83%	100%	64%	95%
1055	'FTON	49	35	38	33	44	0	0	0
		90%	91%	95%	94%	86%	0%	0%	0%
1017		40	35	29	21	43	34	0	0
		83%	80%	86%	67%	91%	76%	0%	0%
1020		19	18	21	27	24	24	29	24
		63%	44%	71%	89%	96%	96%	90%	96%
1019	Y	18	40	26	20	29	27	0	0
		39%	75%	77%	60%	52%	81%	0%	0%
1028	:ICK	43	0	0	0	0	0	0	0
		56%	0%	0%	0%	0%	0%	0%	0%
1006	:CK	6	11	24	30	6	29	10	26
		67%	82%	96%	93%	83%	93%	90%	92%
1027	\ND	22	28	20	29	23	23	22	34
		77%	86%	75%	86%	83%	91%	82%	94%
1014	LT	36	44	13	35	29	24	29	30
		83%	89%	8%	80%	90%	75%	83%	83%
1026	ER	44	27	44	33	36	29	31	27
		98%	74%	75%	97%	89%	90%	100%	100%

Exhibit 12

Reading Progress Report

$RD PROGRESS REPORT
WHITE CENTER ELEM. 28 JUN 76

NAME	TIME (MONTHS)	GAIN IN MONTHS WA	VOC	LC	IC	WS
JESS	5.9	+3	+8	+15	+0	+5
ROBB'	8.3	+2	+6	+12	+0	+4
WILL:	8.9	+9	+9	+10	+9	+6
RICK'	8.4	+6	+12	+16	+5	+9
DEBB	9.6	+16	+16	+16	+15	+11
ADRI	8.7	+7	+7	+8	+6	+6
DAVI:	8.9	+7	+9	+9	+8	+5
TERRI	2.1	+3	+3	+3	+3	+3
KIM	1.4	+1	+3	+2	+2	+2
DANN	9.6	+9	+9	+10	+10	+9
ROBB	9.1	+7	+7	+7	+7	+6
CARR	5.5			BASIC SENTENCES		
DIAN	10.9	+14	+14	+14	+12	+13
DONN	10.9	+12	+12	+13	+9	+10
VANE	8.4	+7	+9	+6	+5	+6
BILL'	11.3	+15	+17	+16	+14	+7
HARR	6.5	+4	+10	+15	+0	+4
LADE	8.1	+12	+11	+11	+10	+11
MARL	8.1	+14	+14	+14	+13	+11
WILL:	8.6	+3	+7	+14	+0	+5
CATH'	7.4	+7	+9	+8	+6	+5
JANI	6.1	+7	+7	+7	+7	+7
GEOR	7.7	+8	+8	+8	+6	+7
PERR'	8.2	+9	+11	+11	+9	+10
DIAN	9.4	+8	+14	+24	+2	+8
LISA	8.8	+4	+10	+14	+3	+7
CHARI	6.3	+8	+8	+7	+7	+5
MARK	7.0	+3	+7	+12	+0	+6
SAND'	10.6	+3	+31	+35	+0	+5
DEBB:	9.5	+11	+11	+11	+11	+10
JEFF	7.9	+3	+7	+13	+0	+5
JEFF	6.4	+7	+7	+7	+6	+5
ARTY	1.7	+1	+1	+3	+0	+2
MARY	9.2	+9	+10	+11	+9	+10
ANIT	7.2	+10	+10	+10	+9	+7
ROBI	9.0	+11	+12	+12	+11	+10
TONY	2.5	+2	+2	+1	+2	+2
CURT:	8.7	+5	+11	+17	+3	+7
DONN	9.4	+11	+11	+11	+11	+9
JANI	8.7	+9	+9	+10	+9	+9
LOUI	5.3	+4	+4	+4	+3	+1
TAMM'	9.7	+10	+11	+11	+11	+9
DAVI	7.8	+7	+8	+8	+7	+6
COUNT	42	42	42	42	39	42
MEAN	7.8	7.3	9.6	11.1	6.7	6.8
STD DEV	2.3	3.9	4.8	5.8	4.2	2.8
SUM	328.0	308	402	466	260	285
SUM SQS	2791.2	2886	4812	6596	2406	2265

END OF REPORT

Exhibit 13

Language Arts Starting Level Report

Indicates the achievement levels reached after the preliminary placement lessons early in the year.

STARTING LEVEL INFORMATION FOR CAI $LA PROGRAM

STD NO	NAME	TIME(MIN)	1	2	3	4	5	6	7
1038	BI	131	3.3	3.5	3.5	3.4	3.4	0.0	0.0
1023	BI	133	4.5	4.5	4.6	4.6	4.6	4.5	4.6
1012	BI	140	6.5	6.5	6.5	6.5	6.5	6.5	6.5
1027	BI	129	5.0	5.0	5.0	5.0	5.1	5.0	5.0
1026	BI	130	5.5	5.5	5.5	5.5	5.5	5.5	5.5
1033	C[illegible]	125	4.1	4.2	4.1	4.2	4.2	4.0	4.2
1031	DE	123	3.5	3.5	3.5	3.5	3.5	0.0	0.0
1020	H[illegible]	129	3.2	3.5	3.1	3.4	3.5	0.0	0.0
1021	HI	133	6.0	6.0	6.0	6.0	6.0	6.0	6.1
1008	HI	129	5.0	5.0	5.0	5.0	5.0	5.0	5.0
1035	ME	123	4.7	4.8	4.7	4.9	4.9	4.2	3.8
1029	MI	124	5.0	5.0	5.0	5.0	5.0	5.0	5.0
1011	OC	124	5.5	5.5	5.5	5.5	5.5	5.5	5.5
1024	S[illegible]	131	3.9	3.9	4.0	3.8	3.9	0.0	3.7
1017	S[illegible]	128	5.6	5.5	5.5	5.5	5.5	5.5	5.5
1004	S[illegible]	132	5.5	5.5	5.5	5.5	5.5	5.5	5.5
1028	ST	133	5.0	5.1	5.0	5.0	5.1	4.0	5.1
1022	ST	130	4.5	4.5	4.6	4.6	4.6	4.7	4.7
1025	VC	128	5.0	5.0	5.0	5.0	5.0	5.0	5.0
1018	WH	123	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1005	WI	132	5.5	5.5	5.5	5.5	5.5	5.5	5.5

END OF REPORT

DONE

Exhibit 14

Language End-of-Lesson Report

$LA END-OF-LESSON REPORT
MOUNT VIEW ELEM. 28 JUN 76

NO.	NAME	LAST EIGHT LESSONS TOTAL PROBLEMS / PERCENT RIGHT							
1069	TOM	41	52	78	4	55	65	59	56
		80%	88%	77%	100%	69%	77%	80%	82%
1139	JERR	32	30	0	0	0	0	0	0
		72%	67%	0%	0%	0%	0%	0%	0%
1002	RONN :Y	24	27	25	24	0	0	0	0
		79%	74%	60%	79%	0%	0%	0%	0%
1054	GREG	29	0	0	0	0	0	0	0
		69%	0%	0%	0%	0%	0%	0%	0%
1021	BILL	31	27	27	26	29	25	31	29
		81%	74%	85%	96%	90%	76%	81%	90%
1025	KEITH	22	18	21	23	24	32	21	0
		64%	50%	90%	65%	63%	97%	57%	0%
1136	DAVII	29	12	24	10	10	14	0	0
		90%	58%	88%	40%	60%	50%	0%	0%
1071	KIM C	15	0	0	0	0	0	0	0
		33%	0%	0%	0%	0%	0%	0%	0%
1081	SHERI	44	46	29	40	28	33	21	26
		91%	85%	86%	85%	93%	88%	90%	65%
1124	CONNI	56	24	25	30	46	47	31	43
		89%	83%	68%	80%	74%	81%	74%	81%
1156	BILL	23	28	19	24	21	0	0	0
		70%	46%	53%	100%	52%	0%	0%	0%
1075	--	23	30	32	20	22	14	26	17
		74%	93%	59%	55%	86%	71%	77%	53%
1076	DINO I	10	27	20	0	0	0	0	0
		100%	85%	75%	0%	0%	0%	0%	0%
1109	CHRIS	26	29	26	32	26	31	23	36
		96%	86%	96%	94%	100%	90%	87%	92%
1151	ROSEMA EROSA	29	55	29	53	30	39	33	45
		90%	89%	93%	87%	97%	95%	94%	87%
1042	ALVIN	26	26	10	23	34	24	30	32
		58%	100%	100%	74%	88%	96%	83%	88%

Exhibit 15

Language Arts Progress Report

$LA PROGRESS REPORT
MOUNT VIEW ELEM. 28 JUN 76

NAME	TIME (MONTHS)	GAIN IN MONTHS 1	2	3	4	5	6	7
TOM	6.2	+18	+11	+19	+15	+29	+23	+21
BYRC	3.4	+6	+19	+18	+21	+24	+21	+29
JERI	6.1	+19	+16	+15	+20	+19	+20	+20
RONI	4.9	+13	+20	+13	+17	+18	+8	+16
DAVI	1.6	+3	+3	-8	+4	+6	+3	+2
GREG	6.1	+29	+25	+15	+20	+28	+26	+30
BILL	5.1	+11	+17	+11	+15	+19	+15	+17
KEITI	7.2	+31	+27	+19	+31	+18	+23	+29
DAVI:	5.0	+6	+8	-5	+7	+6	+10	+8
KIM '	1.2	+1	+1	-9	+1	+3	+3	+2
SHER	4.4	+17	+19	+18	+16	+30	+16	+24
CONN.	6.1	+15	+22	+17	+21	+28	+11	+28
BILL	5.4	+10	+12	+11	+9	+8	+13	+14
CARL	NOT ON THE SF FILE ANY LONGER.							
DINO	5.7	+44	+15	+15	+15	+15	+15	+15
DAN E	2.4	+5	+4	+7	+6	+12	+7	+6
CHRIS	3.5	+11	+14	+10	+16	+21	+8	+16
ROSEM :A	5.2	+20	+27	+19	+27	+28	+25	+31
ALVIN	6.6	+21	+21	+12	+21	+25	+21	+14
EDDY	5.9	-9	+12	-8	+12	+21	+4	+11
DINO	2.5	-4	-1	-1	+3	+6	+0	+1
SHAWN	5.2	+3	+8	+5	+1	+11	+1	+11
BECKY	6.8	+16	+18	+8	+16	+11	+17	+17
JOHN	8.7	+30	+27	+24	+30	+30	+30	+30
TROY	4.4	+10	+12	+8	+16	+23	+9	+15
JACKI	7.1	+22	+21	+19	+25	+26	+22	+24
JAIMI	5.7	+13	+18	+14	+19	+29	+16	+17
GLENN	5.7	+25	+20	+16	+22	+24	+27	+25
WAYNE	8.5	+29	+30	+28	+32	+33	+27	+34
BRIAN	5.3	+8	+17	+9	+11	+16	+8	+21
RAEAN	0.4	+1	+2	+2	+3	+2	+1	+2
ARETT	6.2	+29	+31	+28	+30	+32	+8	+32
NICK	7.7	+30	+32	+25	+32	+32	+30	+32
TONY	8.2	+15	+22	+16	+19	+22	+18	+18
SAMMY	4.6	+4	+22	+15	+23	+28	+13	+15
WESLE	5.3	+16	+18	+17	+17	+29	+16	+18
CHRIS	7.5	+20	+20	+19	+25	+29	+24	+30
KAY W	4.6	+14	+13	+8	+18	+16	+14	+18
COUNT	37	37	37	37	37	37	37	37
MEAN	5.3	14.9	16.8	12.1	17.2	20.5	14.9	18.7
STD DEV	1.9	11.1	8.3	9.3	8.7	9.0	8.5	9.3
SUM	196.4	552	623	449	636	757	553	693
SUM SQS	1178.9	12776	13061	8649	13714	18463	10967	16163

END OF REPORT

DONE

APPENDIX B

PARENT REPORTING SYSTEM

Exhibit I - Mathematics Progress Report - Parent

HIGHLINE PUBLIC SCHOOLS SCHOOL DISTRICT 401

P.O. BOX 66100 SEATTLE, WASHINGTON 98166

ROBERT D. SEALEY, SUPERINTENDENT

CASCADE JUNIOR HIGH SCHOOL

CARROLL MYERS, Principal
11212 - 10th Avenue Southwest
Seattle, Washington 98146
433-2551

October 31, 1975

Dear Parent:

_____ has been working to build his/her basic skills in Mathematics through a program in Computer Assisted Instruction.

In CAI, the student spends ten minutes a day working lessons specifically designed to meet her/his needs. This program is used to supplement the student's work with the regular classroom teacher. The lessons are presented through the use of a computer. The computer evaluates the student's work and either moves him/her to new material or continues to give the student more drill and practice to help her/him master the more basic skills.

A year's worth of work is divided into 24 blocks, and the student moves through the curriculum at his own pace. As a general rule, if the student has completed _____ blocks to this point in time he/she is doing well.

On the back of this sheet is an index of the basic skill areas covered at each level. Also, included with this letter is a report on your child's progress to date.

If you are interested in finding out more about this program or your student's progress, contact your school. Also, if you would like to visit the program and see it in action, contact the school principal. We appreciate your interest.

Respectfully,

C. F. Myers, Principal

Jay Davis, Teacher

MATHEMATICS CURRICULUM

Note: Levels of difficulty for the operations range from the least difficult D1 to the most difficult D5.

BLOCK	LEVEL 1		LEVEL 2		LEVEL 3	
1		Counting/Sequences	D3	Addition	D4,5	Multiplication
2		Inequalities	D3,4	Add/Sub.	D4,5	Division
3	D1	Addition	D3	Multiplication	D2	Fractions (A/S/Red.)
4	D1	Subtraction	D3	Division	D3	Decimals (A/S/Round)
5	D1	Units of Measure	D4	Multiplication	D3,4,5	Fractions (A/S/Red.)
6	D2	Addition	D4	Division	D3,4	Fractions (Mult.)
7	D2	Subtraction	D5	Multiplication	D3,4	Decimals (Mult.)
8	D3	Addition	D5	Division	D4	Units of Measure
9	D3	Subtraction	D1,2	Fractions (Recog.)	D3,4	Fractions (Div.)
10	D2	Units of Measure	D2,3	Mult./Div./Fract.	D2	Ratios & Percents
11	D1	Subtraction	D2	Fractions (A/S)		Fractions (Mixed Drill)
12	D1	Multiplication	D3	Units of Measure	D5	Units of Measure
13	D1-4	Add/Subtraction	D2,3	Fractions (A/S)	D1,2	Variables (A/S)
14	D2	Multiplication	D1,2	Decimals/Fractions		Inequalities/Exponents
15	D3	Multiplication		Mixed Drill (A/D/F)		Negative Numbers
16	D2	Units of Measure	D2,3	Decimals (A/S)		Commutative Law
17	D4	Multiplication	D4	Units of Measure		Associative Law
18	D1	Division	D5	Fractions/Mixed No.		Distributive Law
19	D5	Multiplication	D3,4	Decimals (A/S)		Mixed Drill (CAD)
20	D2	Division	D2,3	Decimals (M/Round)		Drill in Addition
21	D3	Units of Measure	D3,4	Fractions (M/D)		Drill in Subtraction
22	D3	Division		Decimals (Mixed Drill)		Drill in Multiplication
23	D1	Fractions (Recog.)	D1	Ratios & Percents		Drill in Division
24		Special Mixed Drill		Special Mixed Drill		Special Mixed Drill

Exhibit 2 Reading Progress Report - Parent

HIGHLINE PUBLIC SCHOOLS SCHOOL DISTRICT 401

P.O. BOX 66100 SEATTLE, WASHINGTON 98166

ROBERT D. SEALEY, SUPERINTENDENT

CASCADE JUNIOR HIGH SCHOOL

CARROLL MYERS, Principal
11212 - 10th Avenue Southwest
Seattle, Washington 98146

January 23, 1976

Dear Parent:

_____ has been working to build his/her basic skills in Reading through a program in Computer Assisted Instruction.

In CAI, the student spends ten minutes a day working lessons that are designed to meet her/his specific needs. This program is used to supplement the student's work with the regular classroom teacher. The lessons are presented through the use of a computer. The computer evaluates the student's work and either moves the student to new material or continues to give the student more drill and practice to help him/her master the more basic skills.

The program covers Reading skills from grade three through grade six. There is a year's worth of work at each grade level. The student works in five Reading skill areas. They are:

WORD ATTACK - studying words as units.

VOCABULARY - building a reading vocabulary.

LITERAL COMPREHENSION - understanding the meaning of sentences and short paragraphs.

INTERPRETIVE COMPREHENSION - explaining sentences and short paragraphs.

WORK-STUDY SKILLS - learning to use references effectively.

_____ has shown a growth of ____ months in Word Attack, _____ months in Vocabulary, _____ months in Literal Comprehension, ____ months in Interpretive Comprehension, and _____ months in Work-Study Skills. This has been accomplished in ___ months' time. A growth of one month per month in the program is excellent.

If you would like to find out more about this program or your child's progress, please contact your school. Also, if you would like to visit the program and see it in action, contact the school principal. We appreciate your interest.

Respectfully,

C. F. Myers, Principal

Jay Davis, Teacher

Exhibit 3 Language Arts Progress Report - Parent

HIGHLINE PUBLIC SCHOOLS SCHOOL DISTRICT 401

P.O. BOX 66100 SEATTLE, WASHINGTON 98166

ROBERT D. SEALEY, SUPERINTENDENT

CASCADE JUNIOR HIGH SCHOOL

CARROLL MYERS, Principal
11212 - 10th Avenue Southwest
Seattle, Washington 98146
[illegible]-2551

January 23, 1976

Dear Parent:

_____ has been working to build his/her basic skills in Language Arts through a program in Computer Assisted Instruction.

In CAI, the student spends ten minutes a day working lessons that are specifically designed to meet the student's needs. This program is used to supplement the student's work with the regular classroom teacher. The lessons are presented through the use of a computer. The computer evaluates the student's work and either moves the student to new material or continues to give the student more drill and practice to help her/him master the more basic skills.

The program covers Language Arts skills from grade three through grade six. There is a year's worth of work for each grade level. The student works in seven major areas of common Language Arts usage. They are:

PRINCIPAL PARTS OF VERBS

VERB USAGE

SUBJECT-VERB AGREEMENT

PRONOUN USAGE

CONTRACTIONS, POSSESSIVES, AND NEGATIVES

MODIFIERS

SENTENCE STRUCTURE

_____ has shown a growth of _____ months in Principal Parts of Verbs, _____ months in Verb Usage, _____ months in Subject-Verb Agreement, _____ months in Pronoun Usage, _____ months in Contractions, Possessives, and Negatives, _____ months in Modifiers, and _____ months in Sentence Structure. This has been accomplished in _____ months time. A growth of one month per month in the program is excellent.

If you would like to know more about this program or your child's progress, please contact your school. Also, if you would like to visit the program and see it in action, contact your school principal. We appreciate your interest.

Respectfully,

C. F. Myers, Principal

Jay Davis, Teacher